

PLAUSIBLE IMPACTS OF NEW COMMUNICATIONS TECHNOLOGIES
ON FUTURE HUMAN SETTLEMENTS
AS ESTIMATED BY
IMPACT RANGING BY ALTERNATE SCENARIOS (IRAS)

by

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ABSTRACT

A new method for investigating plausible future impacts of innovations, trends, and accidents is devised, applied and evaluated. The method, Impact Ranging by Alternate Scenarios (IRAS), is tested on the question of the possible impacts of new communications technologies on human settlements.

IRAS is distinguished by its recognition of the multi-option form of the future and treats possible impacts in multiple contexts. It is designed as a thinking tool for use by interdisciplinary teams or individual researchers.

The study concludes with recommendations for constructive present actions to deal with plausible futures.

ACKNOWLEDGEMENTS

First in time and throughout was my wife, Leslie, who gave me anchorage and sea room.

Without stopping for a breath come thanks and gratitude for Frank Davidson, without whose help and encouragement I never would have gotten into this field of endeavor.

The thoughts and work of Ted Gordon, Willis Harman, Martin V. Jones, Olaf Helmer, Herbert Holloman, Bertrand de Jouvenal, Russell Rhyne, and Donald Schol form the intellectual base on which this work balances; to them thanks for living their lives as they have.

In an operational and most personal way, I must thank Francis Ventre, my thesis advisor, for his criticism and assistance all along the way. A process was made into a thesis. In the same vein, I would like to thank Len and Sue Buckle for their help throughout.

Second to last isn't much a place to be in acknowledgements, you aren't even honored with a "finally". Nevertheless, without the assistance of Gary J. Felser this thesis would never, ever have been completed.

Finally, this whole study is based on the work of a large international panel of very busy volunteers, many of whom served without even acknowledgment, let alone recompense. To each goes my gratitude and a copy of this piece of work, poor payment but all I can give. Thank you.

This thesis is dedicated to Thomas Jefferson.

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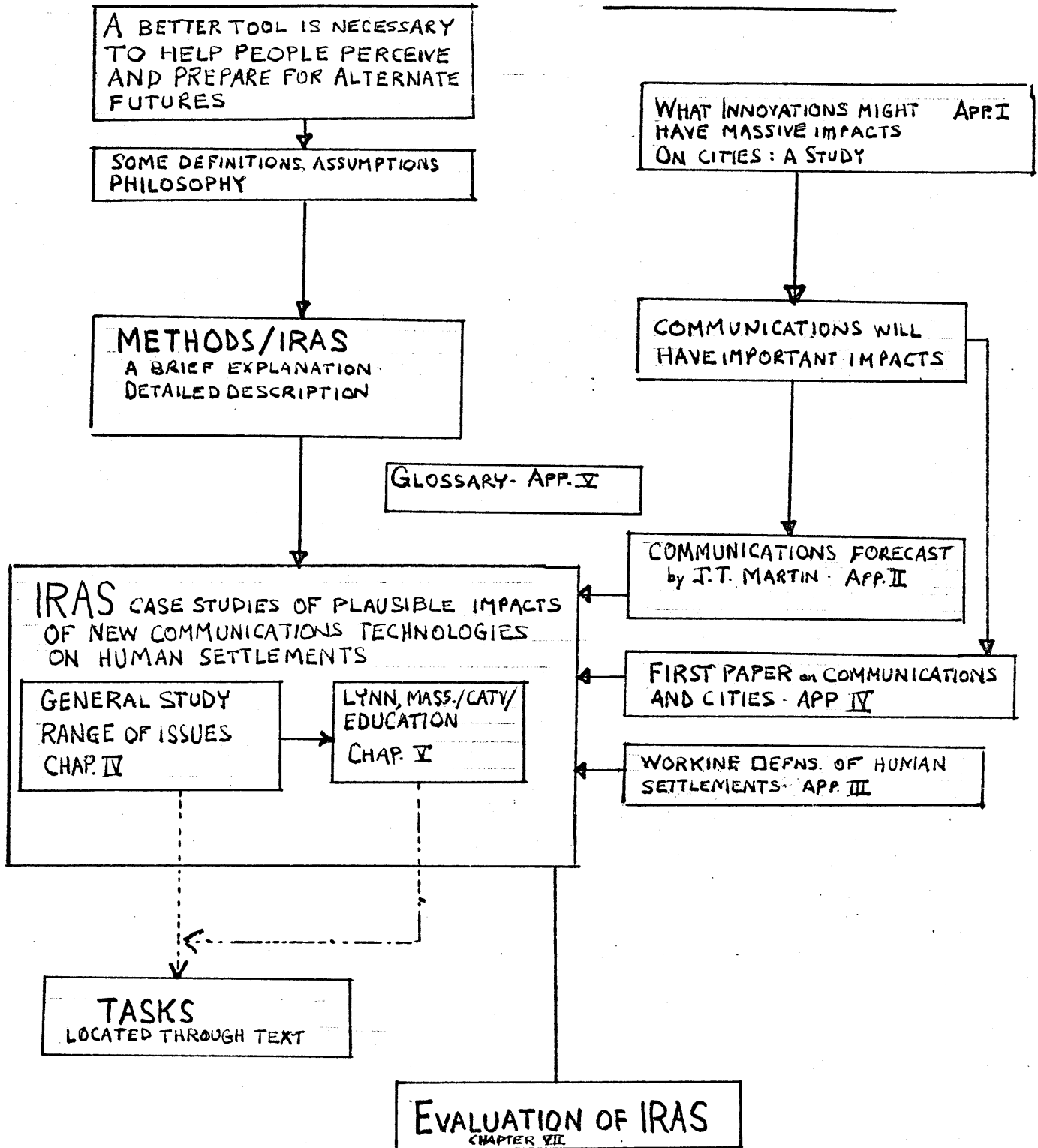
CHAPTER I: INTRODUCTION

Roadmap

Defining the Problem: An Introduction

An Open Thesis

THESIS ROADMAP



DEFINING THE PROBLEM: AN INTRODUCTION

Impact Ranging by Alternate Scenarios (IRAS), a method for identifying plausible future impacts of events and devising actions to deal with them is evaluated through tests on some specific innovations.

Several objectives are addressed in this thesis.

1. Devise a method adequate for identifying a maximum number of plausible future impacts of given events:

As will be argued below, the state of the art of assessment seems to point toward some new method based on the facts that impacts occur not in isolation but in concrete societal contexts and that the future is an unknown quantity most usefully imaged as a set of alternatives.

IRAS is a method designed around the concept of alternate futures; it is also well-suited for interdisciplinary teams.

2. Evaluate the new method:

Although this is a most important question for any new method to answer, it was most difficult to attack. The solution has been to initially use a more traditional brainstorming approach on case studies, then to apply IRAS and see if the number and richness of the impacts identified were increased.

3. Speculate on some plausible impacts of the new communications technologies on human settlements:

A number of constraints were placed on this case study: to confine attention to the next quarter century; as a first approximation, to pay little attention to chronology and merely speculate on the identity of the impacts and not when they would occur; to look at

American settlements; to define "human settlements" in terms suggested in Appendix III; to emphasize finding present tasks which the reader of this thesis might perform in the present so that he/society might begin to cope with some of the possibilities of the future (this philosophy of client is explained more fully below).

4. Speculate on plausible impacts of educational uses of cable television on Lynn, Massachusetts:

The same constraints as above were adopted. The hypothetical clients for this section are the planners, government and citizens of Lynn. The purpose of the section was to acclimate the clients to the new possibilities and to suggest present tasks.

5. Service my clients:

Every policy-oriented author ought to identify an audience and write to and for them, even if that audience as defined as the whole world. The recommendations of this thesis are directed to you readers personally because you are responsible for a part of the future. I believe that each of us has a responsibility and resources to influence events to come. I don't believe that a thesis addressed to the world at large would influence many people nor could I identify a client group who could receive such a broad collection of recommendations and statements as are made in the case studies.

The recommendations are all structured for whomever reads this thesis. When it is stated, "The government ought to...", it really means, "You, reader, ought to..." by whatever means you care to employ, if you care about getting results. I take this work as personally as I do the future.

AN OPEN THESIS

The next step in reading this piece of work is to get out a pen and a piece of paper and prepare to get involved.

The pages behind this one are an attempt to temporarily nail down a process of thought and investigation without killing it.

The process was originally directed toward finding some way to evaluate the plausible impacts that an innovation or other event might conceivably have on our futures.

The two questions taken up first were how such a future investigation might be made and on what topic.

In the latter part of 1971 and on into 1972, an international panel of experts in a variety of fields looked at its own ideas of which innovations might have massive effects on future cities. Their work is recorded in Appendix I. This panel concluded that communications technologies were the present innovations with perhaps the most important future implications. (See Appendix I).

In the process of trying to figure out what those implications might be and what they meant, a new way of looking for implications emerged. This lead to IRAS.

The problem is a large one and the thesis says more about the method than it can say conclusively about communications or cities.

The immediate objective, devising and testing the method, has been met. The evaluation of communications impacts has reached the point where the subtotal button can be pushed and the readers' comments solicited.

The work is structured to encourage you to ⁶¹inwert your own thoughts. — Each page of Chapter IV for instance, contains a possible impact of the adoption of the new technologies of cable television, cassette television, large screen television, three dimensional television, or other innovation (a full listing is contained in a technology forecast in Appendix II; terms are defined in the glossary, Appendix V). Below the initial impact statement are comments based on the results of the new IRAS method and any recommendations for tasks to be done in the near future. I would like to know what you think about any of these that interest you, whether you are a member of the committee to pass on this thesis, a member of the forecasting panel, or "other". Do you have any reactions or comments? Would you be interested in working in one of the areas or do you know someone who is?

In all probability, I will be a doctoral student at MIT through 1976. In any case, I can be reached through the campus Alumni Office. Please get in touch and tell me what you know and what you think. I promise not only to reply but also to send you a digest of what others have written me on similar topics.

Thanks for starting to read; I hope you finish. As you have seen, this thesis was written for you.

CHAPTER II -- PHILOSOPHY OF THE EFFORT -- BASIC ASSUMPTIONS

PHILOSOPHY OF THE EFFORT -- BASIC ASSUMPTIONS

The key image in present visions of forecasting is the assumption of alternate futures, the picture of the future as distinct possibilities of varying probabilities.

This assumption may be phrased in two ways, either of which is sufficient for the purposes of this work.

1. One is that an infinite number of futures are possible.

We can make estimates of the probability of a given type of future and we can attempt to alter the probability by taking action in the present. If it were possible to repeat history, it might differ next time around in this view.

2. The other view holds that there is only one future and

that that is the one that "will have happened". We will make our choices, exert our influence, and think we have changed things because a desired result occurred, but every action we take is for a reason.

If it were possible to repeat history again and again, events would always occur precisely the same way. Every individual would always do the same things and make the same choices.*

There is only the illusion of free will. In this second view, alternate futures represent only our current ideas about the future, our uncertain guesses about that which is ultimately certain.

The two formulations of the image are different but, as a guide to

* I do not wish to bring the Heisenberg Uncertainty Principle into the discussion.

action they are the same. In this thesis, different possible futures will be discussed and measures to "change the future" will be postulated. Interpret the statements as you wish, free will or no. The idea of alternate futures is key to the concept of IRAS.

Several arbitrary assumptions have been made and the effort rests upon them. To wit:

1. The possibilities of alternate futures are a useful target for investigation. Reasonable investments of time and resources will be cost-effective.*
2. I assume that it is useful to think of the course of events in terms of causes and effects and that there can be correlation between causal models of this type and observed reality processes. An assumption of actual, definable, observable causality in societal

* Other assumptions (that would have led to not doing future studies): attempts to extend our sensitivity into the future will result in increasing swerves of policy and anxiety; the profits of futurism will be used to perpetuate inequality and result in societal disbenefit; the dynamics of the unfolding future are so complex and/or the role of complete uncertainty so great that efforts to do more than guess will not be cost-effective.

The question of how much risky change to tolerate in society arises. I believe that it is up to society to decide whether to take a risk.

Conscious consideration of risk and uncertainty may lead to "decreased performance" if society does not like lotteries. In other words, many rationally favorable alternatives of types chosen all the time in ignorance presently might be rejected if society rejects the uncertain because it prefers to keep what it has.

Despite this argument, I cling to my assumption that the people ought to think about risk and their collective future. I refer you to p. 249 of this thesis. That Jefferson said it makes it no more valid; I just like the way he put it.

processes is not necessary. As Piet Hein put it,

We glibly talk
of nature's laws
but do things have
a natural cause?

Black earth becoming
yellow crocus
is undiluted
hocus pocus.*

* "The Miracle of Spring" in Piet Hein's Grooks (Cambridge:MIT Press,1966),p.11.

CHAPTER III --- IMPACT RANGING BY ALTERNATE SCENARIOS (IRAS)

Approaches to the Problem: Definitions and a Search
for Method

Impact Ranging by Alternate Scenario (IRAS): A Brief
Description

IRAS: A Detailed Description of the Method

Case Studies: An Evaluation of the IRAS Method

APPROACHES TO THE PROBLEM: DEFINITIONS AND A SEARCH FOR A METHOD

First, some definitions.

This thesis and this method are about "assessment." By this I mean an attempt to intelligently guess what events might occur due to the occurrence of some primal event. That first event might be expected to occur in the future, might have occurred in the past, might not be expected at all and be purely hypothetical (e.g. "Let us assess what might happen to this planet if a peaceful expedition of humanoids from another stellar system came to say 'Hi!'")

"Technology assessment" is the art of assessing the societal phenomena that might be caused by the adoption of a new technology ; it is a special case of the more general arts of assessment. Both case studies to which IRAS is applied in this thesis are exercises in technology assessment.

"Event" is rather sloppily defined for the purposes of this thesis as something that happens, e.g. a trend, a surprise, a hero, the behavior of a system. If you wish to define some of the preceding examples as collections of events, that will also do.

"Technology" is/are that which is used to do. It might be a mechanical something, a system of men working together to run a hotel, a recipe. All have in common the application of knowledge through action to some purpose.

"Technology forecasting" is the exercise of trying to give dates and identity to the advent of technology not yet in existence or widely adopted. One may attempt to forecast a scientific

breakthrough as well. There are many methods for doing technology forecasting; except for the fact that the case studies in this thesis use a previously prepared technology forecast as input, this thesis and IRAS have nothing at all to do with technology forecasting. There appear to be applications for IRAS in that direction, but they will not be discussed in this work.

Additional definitions of terms used in this thesis may be found in Appendix V.

A cursory search of the literature of assessment methods was made during the early phases of the research. Indications were that most assessment exercises have largely used brainstorming; a single person or task group would address a given issue of future possibility and try to think of what might occur if given events came to pass, then write up the results. Some very primitive uses of dynamic modeling have been tried but, to the author's knowledge, no results have been applied.*

MITRE did a pilot study designed to develop a technology assessment method, and applied the method to five cases.** The method, which can be used by an individual or by a team, is executed in the following steps:

1. Define the assessment task. Discuss issues; establish scope; develop ground rules; define period of study.

* Joseph Martino, article in the October, 1971 issue of The Futurist. Exact reference unavailable.

** Martin V. Jones (ed.) Technology Assessment Methodology (six volumes) (Washington, D.C.: The MITRE Corporation, 1971).

2. Describe the relevant technologies: the major and supporting technologies and the competitive technologies and their supporting technologies.
3. Describe state-of-society assumptions.
4. Identify basic impact areas
5. Make preliminary impact analyses
6. Identify possible action options
7. Complete impact analysis

It was originally decided to use this method for the thesis. In examining the third step of the method, however, it was decided that there might be a better way to go about assessment. In the MITRE method, one attempts to derive from the technology those aspects of society which might alter the impact of the technology, then makes assumptions about the state of society in those areas for the purposes of the study. The pilot MITRE studies also therefore produced a limited set of recommendations based on the long list of assumptions made at the start.

Many of these assumptions appeared not only unnecessary but undesirable. The state of prediction is not good enough in most cases and may never be good enough, to allow one to assume a single state of society for all important background factors.

In the preceding section, it was stated that the central idea of future studies presently is an assumption of alternate futures. It is this idea that the MITRE method appears to ignore and this question that gave rise to the central idea of IRAS.

Appendix I suggests that people's ideas of the future can not be imaged as a single path on which most reasonable men would agree. As reported there, each member of the panel was asked to name an innovation that appeared to him likely to have massive impacts on cities over the next twenty-five years; next came a series of multiple choice questions about their ideas of what society might be like when the impacts of their innovations were first felt.

The answers are reported on page 277. No statistical validity is claimed but the response patterns suggest that the panel members have diverse, contradictory ideas about the future.

A chain of ideas pointing toward IRAS:

1. The future may be most usefully imaged as a set of alternatives
2. Societal forces produce different impacts in different contexts
3. There appear to be few commonly held beliefs about the nature of the future that have a reasonable probability of being correct
4. Attempts to produce context-free assessments are almost certainly fated to produce assessments with an unstated context, probably a context of the here-and-now
5. Inasmuch as real impacts occur, by definition, in some context, the applicability of context-free assessments is dubious

The response has been to devise an assessment method that can deal with a set of alternate future contexts that together span the range of plausibility and use these as background for assessment, speculation and policy recommendations.

IMPACT RANGING BY ALTERNATE SCENARIOS (IRAS): A BRIEF DESCRIPTION

The business of society is to work its way into the future the best way it can, steering in the directions it favors. The best way to serve individuals is to inform them of the variety of possibilities so that plans can be made sufficiently flexible. This is the purpose of IRAS. Two things to remember about this method as you read the rest of this document:

1. The ultimate object of IRAS is to try to produce some statements about what ought to be on a planner's, politician's or citizen's agenda; which future prospects ought to be thought about now.

2. All this method can do is attempt to discipline the thoughts of the individual or group using it. The thoughts themselves are not the product of the method nor does it give them any special magic to have emerged from an application of IRAS.

Charts representing the model of societal change upon which this method is based and the actual working of IRAS are reproduced on pages 28-29.

In its simplest conception, IRAS pairs possible impacts of an event with plausible states of society in which that impact might occur. These "states of society" are scenarios, each one representing a different path of societal development. They are predictions only in that they are plausible pictures of how things in general might turn out.

These background statements frequently alter initial ideas about what impacts new technologies ideas might have. For examples of impacts turn immediately to Chapter IV. The scenarios applied to the initial impact statements may be found on pages 35-38.

The three ingredients necessary for using IRAS are a set of scenarios, a forecast of those primal events to occur, and, derived from the forecast, a preliminary statements of impacts.

The technology forecast used in this thesis was done by James T. Martin; some small additions were made and appear in the impact statements. Martin's forecast is reproduced verbatim in Appendix II.

The preliminary statement of impacts is just the thoughts of the author on the sorts of impacts that the new communications might have. They are organized outline fashion. Each chain begins with an initial thought and leads to other impacts. The image might be of a field of dominos. Push one and others are hit, many falling. Each chain of thoughts discusses which dominos might be hit as a result of some initial push. An early paper on communications impacts and cities is reproduced as Appendix IV that may give a fuller range of impact types than does Chapter IV.

When reading each page in Chapter IV, you will see the preliminary impact statement at the top of the page, the refined impact statement, the fruit of IRAS, below.

IRAS may be easier to understand if its results are examined first. You may wish to look through Chapter IV now before returning for a more detailed explanation of how to use IRAS.

IRAS: A DETAILED EXPLANATION OF THE METHOD

Chart I attempts to illustrate the model of change on which IRAS is presently based. The model assumes that technologies are independent variables and that the basic patterns of invention are relatively independent of changes in society when total time is one or three decades. This is an assumption, possibly a poor one, and it is my hope to investigate in other work. For now, a dotted line shows the potential link from society to technology.

Chart II is a flow chart of the operations of the IRAS method. The technique is iterative and the cycles are run through until the research team is satisfied or out of ideas or time. In this work unfortunately, the critical variable was time. Only one iteration was made for each case study.

Step zero of IRAS, assembling a team, is optional but preferred. In this thesis, the method was used by one person.

An ideal organizational scheme might include a central group and a larger number of others. The central group of two, three or more would define the problem and spend a great deal of time considering how various impacts, trends, technologies, and surprises might possibly interact, using dynamic models where appropriate. The rest of the team would consist of people who would primarily perform studies and provide flesh for the skeleton.

Cooperation should be as close as possible and a great deal of time ought to be devoted to establishing and maintaining intimate, constructive working relationships. The author hopes to spend some time looking at the organization of such teams at a later date.

IRAS is a tool. It should be realized that the team above is described as though its purpose were to use IRAS in order to delineate an ideal operations scheme. In fact, a team would be assembled to attack a problem and work within a number of other types of constraints. If IRAS were judged a useful tool, the team might organize itself to use it as described above.

Step one, the definition of the problem, involves a process of goal- and limitation-setting, involving the range of the study, bounds, targets and quality control. "Quality control" refers to that process through which the researcher intends to guide the findings to insure that the results meet a professional standard. The problem definition for this study is on p.8 . Quality control is insured by the readers of this thesis who have to date contributed a great deal to its form and substance.

Step two, the forecast, has been discussed above.

Step three, the initial impact statement, is not included in this thesis as process; the statements themselves are reprinted in Chapter IV. The operation consists of distilling a great deal of reading and thought into some statements of how technologies might impact "society". Each time such an impact statement is made, it is examined to determine whether the impact seems likely itself to produce further relevant impacts. The process continues until the n^{th} order impacts seem likely to be lost in background noise or implausibility. The primal event is the tree trunk; the impacts branch to twigs, to twiglets.

Step four is the generation of scenarios. The scenario generator is a simple process which is somewhat difficult to explain.

Each scenario is meant to be a sketch of a gestalt, an integrated plausible vision of society's future development.

The aspects of society that are explicitly mentioned ought to specifically relate to the area being examined. For example, depressions and the Federal regulatory policy structure relate to impacts of communications technology while the death rate is not so relevant and would probably not be mentioned explicitly.

The other specification for a "mentionable" is that it tend to be independent of the specific item under investigation. In the scenarios of this thesis, it is assumed as a first approximation that communications technology will not be a primary influence on the scenario conditions. In other words, the initial assumption is that the scenarios may alter the shape of the impacts and not the other way round.

The scenario generating input to IRAS, Field Anomaly Relaxation (FAR), was devised by Johnson Research Associates and staff at the Stanford Research Institute's Educational Policy Research Center.* The FAR process is simple and its outlines should be kept in mind as you read through its somewhat complex execution:

1. The object of the exercise is to produce all plausible scenarios for a given society and a given period of time
2. First, the time period is divided into intervals to any level of detail desired. In this thesis, twenty-five years was divided into two chunks.

*J.R.Rhyne, "Projecting Whole-Body Future Patterns. The Field Anomaly Relaxation (FAR) Method," Stanford Research Institute Memorandum Report EPRC 6747-10 (Stanford: Stanford Research Institute, 1971).

3. All plausible and relevant* events for the first interval are identified
4. The events are assembled into all plausible combinations. Each one of these plausible combinations is called a scene and represents a state of society for that interval or a point within it. A comprehensive set of scenes is generated for each interval of the total period.
5. The scenes are then put into all plausible chronological sequences. Each of these plausible, chronological sequences of events is called a scenario. Each scenario depicts a course of events over the total period of time. For this thesis, each scenario consisted of two scenes, one for 1980 and one for 1990.
6. After aggregating the individual scenarios into patterns, it is back to the beginning again to take another try, changing sectors and factors to reflect what has been learned during the process.

Now to describe Field Anomaly Relaxation in enough detail so that the reader can use it.

The team or individual first sits for a while to consider the problem, asking about areas of relevance, and trying to outline some preliminary scenarios as gestalts**

After splitting the total period into intervals, one begins to concentrate on specific sectors of development. Among the sectors used in this thesis were the structure of the US economy, social cleavages, and global integration.

To each sector is assigned a list of factors, specific plausible situations which, taken as a set, cover the entire range of possible states of the sector. The economy for instance might be 1) prosperous or 2) not prosperous. Both factors are plausible and together they cover the range of plausibility; the number of factors is determined by the needs of the problem.

*"Event" here usually means a description of the state of some aspect of society at the time in question. It can also mean other things; see p.

** Also known as "wholes in the head"

Once a set of sectors and factors has been assembled for each interval in the study, combinations are built up.

As may be seen on p. , each factor is designated by a letter representing its sector and a numeric subscript (e.g. E_2 -- the second factor in the E sector).

Each scene is a plausible combination of one factor from each sector; the scene used in scenario one of this thesis was $E_2 C_2 I_2 S_2 P_2 G_3$. All mathematically possible combinations are formed; the implausible combinations are eliminated.*

After all plausible scenes for each date have been formed, all mathematically possible scenarios are formed, each a series of scenes, and implausible sequences are eliminated.

A typology of these plausible scenarios is devised, showing the major development possibilities.

The team then returns to the beginning of the process, thinking about the scenarios as gestalts; then reforming the sector/factor lists, running through the process until they are satisfied or resources run out.

For this thesis, neither team nor time were available. Instead, initial sector/factor lists were drafted and several sets of scenes were generated using random numbers. The first two plausible scenarios to come out of the process were used. As the thesis grew, two of the original sectors (Price of Energy and Development of Communications Technologies in Other Countries) were eliminated.

Step five in IRAS is a reexamination of the original set of impacts using the scenarios as background. This is the key to the method. What types of impact areas have been missed? How might impacts occur differently than originally postulated in these contexts? How do these possibilities

* This process is a little simpler than it sounds. In practice, all possible pairs are formed and implausibles eliminated; triads and so forth follow. The process of building up to patterned, gestalt thought distinguishes FAR scenarios from a simple use sector/factor lists in step five of IRAS. This type of elimination process is ideally suited for use by a team.

change research tasks, projects, or policy recommendations?

CASE STUDIES: AN EVALUATION OF THE IRAS METHOD

IRAS is a tool to make thinking about future possibilities more disciplined and more productive.

To evaluate its real effectiveness will be a long process.

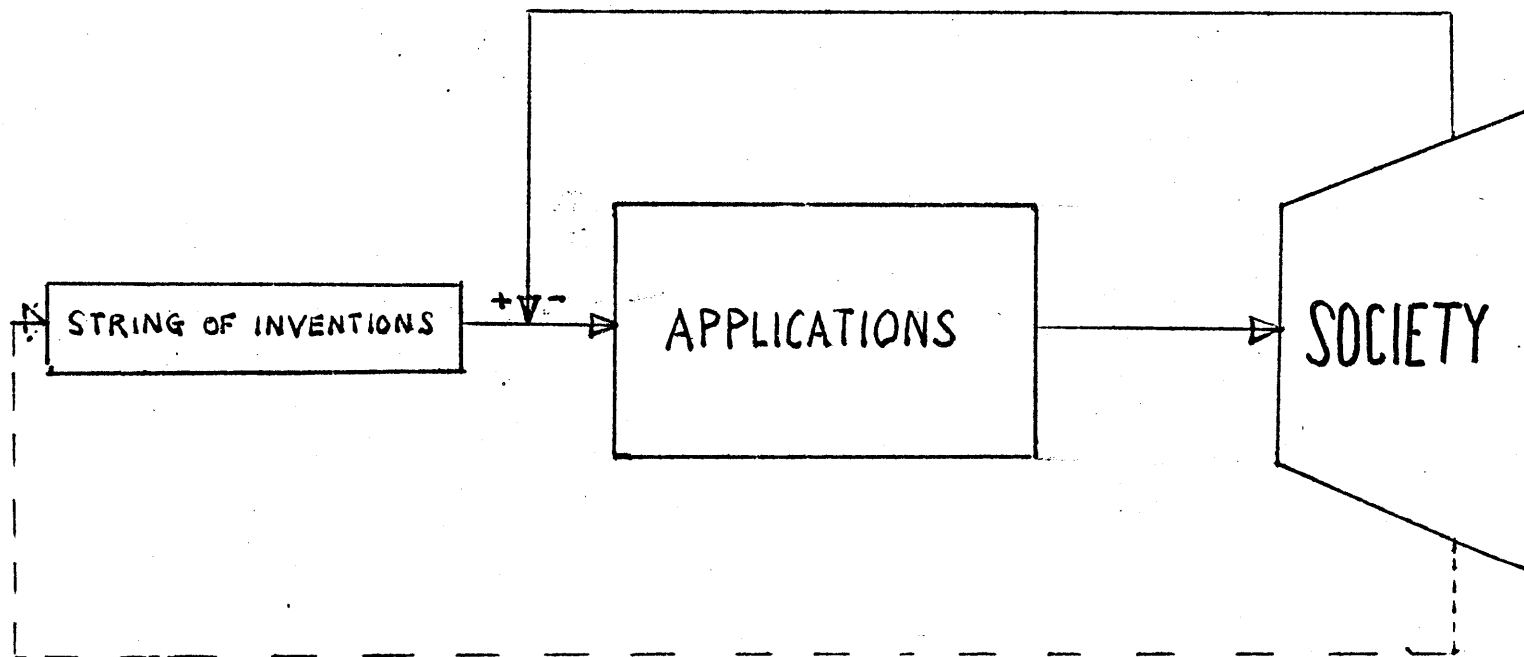
In this thesis a first cut is made by IRAS to two case studies of communications and cities. The material that follows is no better than first draft quality and comes from the typewriter of an undergraduate in urban studies, not a team of professionals with time and resources.

The test is therefore most preliminary but in the succeeding pages, the contribution of IRAS is delineated.

On each page of impacts, material that was (mostly) devised without IRAS is at the top, with IRAS-based comments and the recommendations below.

The top/bottom distinction is really somewhat misleading. Even at the time that the very first draft was written several months ago (Appendix IV), the concepts of IRAS were forming and they influenced the choice of impacts, making them broader than they might have been. In addition, after IRAS was applied, no attempt was made to differentiate new pages of initial impacts deriving from IRAS from ones that had not stemmed from the new method. Approximately one fifth of the impact pages were added after the scenarios were written.

In the conclusions, an evaluation philosophy is set down in greater detail.

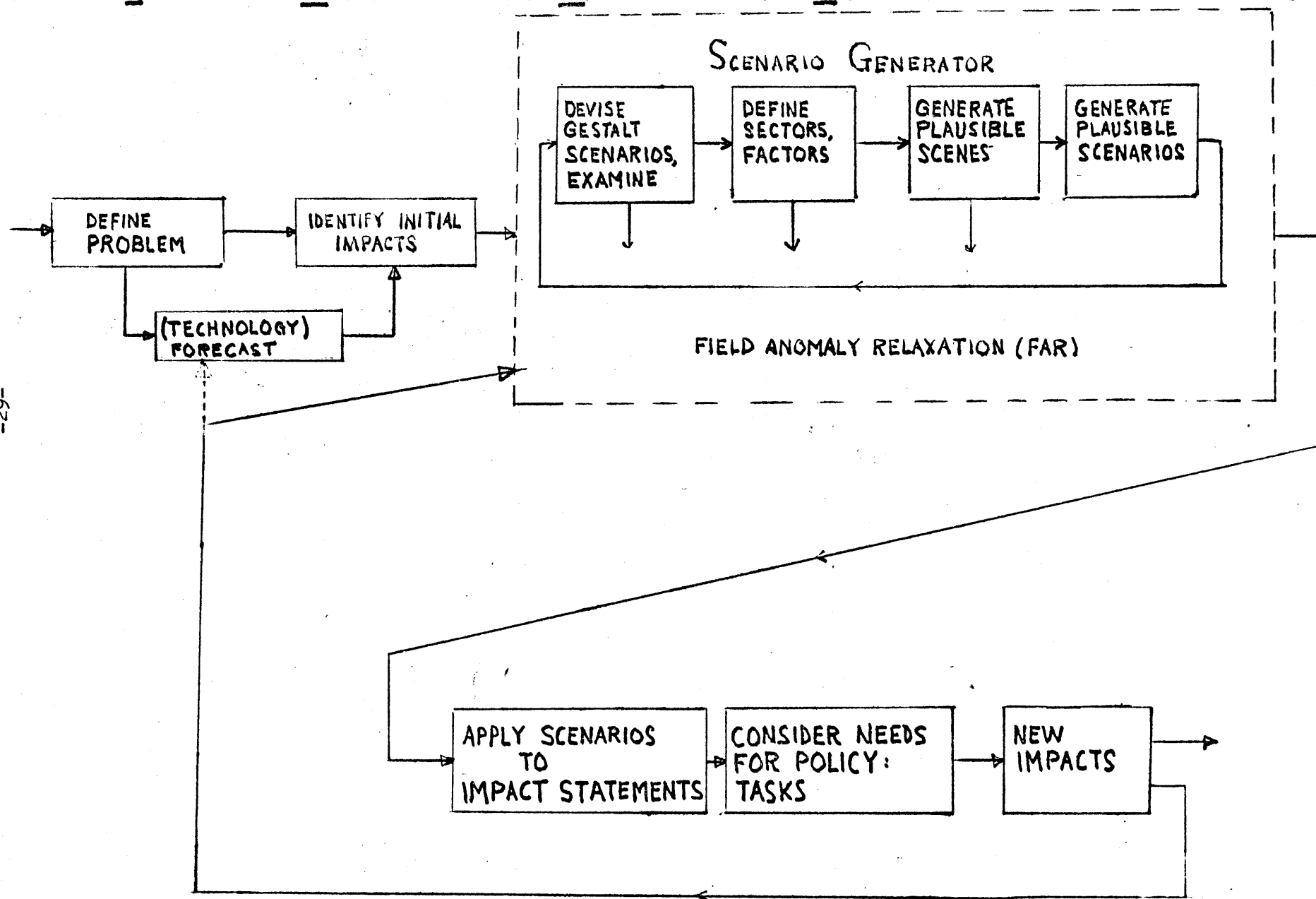


A SIMPLE MODEL OF TECHNOLOGY AND SOCIETAL CHANGE

CHART 1

IMPACT RANGING BY ALTERNATE SCENARIOS

CHART 2



FACTOR SECTOR LIST FOR US: 1980

US ECONOMY STRUCTURE

- E₁ Heavily centralized and manipulated by power centers-- government and private
- E₂ Like today or less concentrated

US ECONOMY STATE

- C₁ Prosperous
- C₂ Not prosperous

US GOVT IMAGE

- I₁ Significantly more disliked by average citizen than presently
- I₂ As trusted, popular as now or more so

SOCIAL CLEAVAGES

- S₁ Significantly worse than today; frequent incidents of violence; decreasing communication between groups (note assumption of violence resulting from cleavage)
- S₂ Society more heterogeneous than today but less exclusive
- S₃ As "homogeneous" as today or more so

POLLUTION LEVELS AND CRISES

- P₁ Pollution crises significantly higher rate, magnitude over 1972; significant widespread ecological disruption beginning to be reflected in prices; some long term indicators recognized to be influenced (e.g. climate)
- P₂ Pollution-levels, crises less than P₁

GLOBAL INTEGRATION

- G₁ World moved significantly toward greater unification, ties

1980 (cont'd)

G₂ Situation about as present

G₃ Significant breakdown in international communication, functional
integration

1990 SECTOR/FACTOR LIST

US ECONOMY STRUCTURE

- E₁ Heavily centralized and manipulated by power structures--
government and private
- E₂ Like today or with lesser concentrations of power

US ECONOMY, STATE

- C₁ Prosperous
- C₂ Not prosperous

US GOVERNMENT RELATION TO CITIZENS

- I₁ Significantly more disliked by average citizen than presently
- I₂ As trusted and popular as present or more so

SOCIAL CLEAVAGES

- S₁ Significantly worse than today; frequent incidents of violence;
decreasing communication between groups
- S₂ Cleavages so extreme that some attempts at separation of
government (secession) have taken place
- S₃ Society heterogeneous, more so than today, but in a "whole
greater than sum of parts" way, less exclusive than today
- S₄ Society more homogeneous than presently

POLLUTION LEVELS AND CRISES

- P₁ Pollution crises creating serious ecological disruption, possible
climatic change, widely recognized loss of life and disruption
of food chain
- P₂ Pollution crises significantly higher rate than 1972
- P₃ Pollution levels at state other than P_{1,2}

1990 (cont'd)

GLOBAL INTEGRATION

- G₁ World moved significantly toward greater integration, ties
- G₂ World integration about like present situation in terms of intercommunication functional integration
- G₃ Less integration, communication

TRANSPORTATION WITHIN URBAN CONCENTRATIONS

- U₁ Automobile still only widely accepted urban mode; problems of congestion, pollution significantly worse than today
- U₂ Either through new technologies improvements to the automobile, cities able to handle, comfortably, significantly greater traffic than present
- U₃ Situation like present

GOVERNING STRUCTURES

- M₁ Principles of sovereignty unambiguous; national governments prime rulers of their territory through most of world
- M₂ In much of world, due to multinational corporations, multinational governmental organizations, and/or popular movements, several governments press claims of influence

SURPRISES

- X₁ National or global scale forceful, possibly violent movement against high technology
- X₂ Nuclear war
- X₃ US Government becomes through evolution or coup a nonbenevolent dictatorship
- X₄ None of the above

1990 (cont'd)

DEMOGRAPHY OF US

- D₁ Population growth has begun to soar again. That proportion of the population at the younger end of the spectrum is growing. Projections for the year 2000 are for levels above 310 million.
- D₂ Population is growing about as projected back in 1972 and will hit about 300 million or perhaps a bit less by 2000
- D₃ Fertility rates have continued to drop. Population growth is almost at zero and prospects are that after a period of time the total population may decline
- D₄ Significant advances in geriatrics are now advancing the life expectancy of a twenty-year old to about ninety-five, with a useful lifespan advanced to the mid-eighties. Although fertility rates are to date about as predicted in the 70's, population is beginning to grow rapidly because of the decreased death rate.

SCENARIO ONE (1980: $E_2, C_2, I_2, S_2, G_3, T_2$)

In 1980, the United States is not in very good shape economically. Although the economy is about as centralized as today, perhaps even less so, the indicators of prosperity are down while inflation is up. The government is about as trusted and popular as it was in 1972. Society has become significantly more heterogeneous than it was eight years ago but not as exclusive; barriers of prejudice are lower than before. People are grouping in unique clumps because they choose to and with less of a feeling of the necessary inferiority of others. Pollution levels have become slightly worse than in 1972 but firm government and business measures have combined to keep things from getting tremendously worse; people are not quite as visibly worried as they were-- this is a standard crisis. For various reasons, the era of good feeling that seemed to have some chance of developing as seen from the early '70's has turned to a period of increased rivalry and misunderstanding on the international scene. Levels of conflict are up and international trade is down.

SCENARIO ONE (1990: $E_2, C_1, I_1, S_4, P_3, G_1, U_1, M_2, X_1$)

In 1990, although the structure of the internal economy has not changed drastically, there has been an upswing and the nation is basically prosperous. The government is in disrepute with society and apathy is high. The creative heterogeneity of the early eighties has collapsed and society is more homogeneous than at any point in history since the beginnings of the United States. The globe is significantly more integrated and tied together than in the past but this has created new types of conflict and this level of "working together" may soon decline. In much of the world, due to multinational corporations, governmental organizations, and international popular movements, people's loyalties are claimed by more than one organization. Turbulence is increasing and, indeed, a movement of global proportions opposed to high technology seems to be gaining strength. The question of how this movement will hit the United States is still open.

The automobile is still the only widely accepted urban mode of transportation. Problems of congestion and urban pollution have gotten much worse over a period of twenty years. Population does not appear likely to let up the pressure. With the new discoveries in geriatrics, the average life expectancies of all Americans are on the rise and the population dip that appeared on its way has been flipped onto its back; a precipitous rise is beginning, not just because of the slip in the death rate but because of a beginning optimism in the long term. Due to strict regulation, many pollution problems of the past are waning although the general stockpiles of garbage are rising still and certain areas, notably cities, are perhaps worse than before over all.

SCENARIO TWO (1980: $E_1, C_2, I_1, S_2, P_2, G_3, T_1$)

By 1980, the United States economy has become heavily centralized and manipulated by power centers in government, industry and labor, much more purposefully than ten years before. This year the economy is not doing well, however, despite measures attempting to guarantee the contrary. For this reason and for others, the national government stands lower in the trust of the nation than it has in many years. Surprisingly enough in such times, the racial hatreds that had scarred the sixties have cooled; American society is heterogeneous but not exclusive: doing one's own thing is a national norm but groups are not taboo. Pollution levels have risen only slightly under the influence of strong government controls and declining GNP growth rates. Tensions have risen abroad, not just between the United States and others but across all sorts of schisms. Nationalism is claimed as a cause. International trade is down and the amount of international functional integration has declined somewhat; the mails to some countries for instance have slowed a bit.

SCENARIO TWO (1990: $E_1, C_1, I_1, S_1, P_2, G_2, U_1, M_1, X_3$)

Dateline 1990: The economy has remained centralized over the last ten years but either control is exercised more effectively or the nation's luck has turned: for this year at least, times are prosperous and have been for a couple of years past. If anything, the government has declined still further in popularity, causing or caused by increasingly violent schisms in society. Blacks, whites, yellows, browns, men and women, east and west: there are frequent instances of violence and antagonism feeds on itself. For all intents and purposes, the nation is ruled by a dictator. Pollution has increased; people blame the government for not enforcing the laws but some of the problem at least comes from backlogs that have built up over the years and from the unavoidable products of a large civilization. The outside world continues troubled but things seem on the upswing; trade is on the rise, for instance.

The automobile is still the only widely accepted urban vehicle. Problems of urban congestion are worse than ever.

Fertility rates have continued to drop and population growth is almost zero.

ON PROBLEMS

Our choicest plans
 have fallen through,
our airiest castles
 tumbled over,
because of lines
 we neatly drew
and later neatly
 stumbled over.

--Piet Hein

CHAPTER IV: ASSESSMENT OF PLAUSIBLE IMPACTS OF NEW COMMUNICATIONS

TECHNOLOGIES ON HUMAN SETTLEMENTS-- A CASE STUDY OF IRAS

Instructions for Using this Chapter

Instructions for Using this Index

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Assessment

Summary of Action Recommendations

CHAPTER IV: PLAUSIBLE FUTURE IMPACTS OF NEW COMMUNICATIONS TECHNOLOGIES
ON HUMAN SETTLEMENTS

HOW TO USE THIS CHAPTER

This chapter consists of a series of separate pages, each of which begins with a preliminary impact statement made before the IRAS scenarios were devised. Each of these statements results from thought and reading about the new technologies and about the future of cities. No conscious method was used but an effort was made to be comprehensive. A number of broad topics (e.g. mobile communicators and their impacts) were unfortunately not covered because of time limitations.

Below are statements made after the initial statement was examined in conjunction with the IRAS scenarios; their concern is with alteration of the impact or new impacts. Also in this section are recommendations for present action. In any evaluation of IRAS, a comparison of the upper and lower sections of each page is most important.

The pages are rather arbitrarily grouped and ordered. An initial subject (e.g. "expanded uses of remote buying") is followed by an estimate of one of its primary impacts on settlements (e.g. "encourage the development of remote banking and 'electronic money'") denoted, outline fashion, with a capital letter.

This primary impact may cause an impact of its own (i.e. a second order impact of the original force, remote buying). Secondary impacts are denoted by arabic numerals.

The outline format is followed throughout so that pages have as designation their place in the outline; a tertiary impact might be marked, "Remote A2b".

Impacts are meant to represent forces. The author does not mean to state, for instance, that if remote buying becomes more prevalent, "electronic money" will definitely appear, only that the occurrence of one event would probably make the other more likely.

Following these introductory pages and preceding the impacts is an index of the impact statements. If you are interested in a particular subject, please use the index. A given train of impacts in the outline may go from education to psychology to government to disaster, following a train of thought.

A compilation of some of the more important recommendations may be found in the conclusions of this thesis.

INSTRUCTIONS FOR USING THIS INDEX

This index has been compiled to help you get to parts of this thesis that might be of particular interest. It is not a particularly good index by normal standards; it is designed to provide starting points for controlled browsing.

If you are in a hurry, topics may possibly be located more quickly by finding common page numbers for two index words that describe what you are interested in. For instance, if you are interested in the regulation of advertising, look for pages listed with both "advertising" and "regulation". Good luck.

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"...in social research, you are usually either disreputable or unhelpful."

-Marris and Rein

Dilemmas of Social Reform

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Remote

INITIAL IMPACT ESTIMATE:

EXPANDED USES FOR REMOTE BUYING. Remote buying has of course begun. Merchandise is sold through catalogues, newspapers, magazines, television. With more diverse and inexpensive media, this trend will probably continue. In particular, plentiful visual channels with reasonably high fidelity will have numerous applications. Ease of transportation will have impact on this trend as of course will the price of power, buyer acceptance, availability of bandwidth and government regulations.

SCENARIO STATEMENT AND TASK:

If some of the basic investments have been made for a wired economy and if the basic idea is viable, an economic downturn and domestic turbulence such as postulated in the first and second scenarios might increase the speed with which remote buying might be adopted.

Would the circumstances of scenario one alter the form of remote buying, the type of system that evolved? Remote buying of weapons is already a big problem; such conditions would not ease things in the slightest. In fact, one policy dilemma that might well arise is the question of whether the Federal Government ought to regulate and record all purchases made "via wire" so as to be able to clamp down effectively

INITIAL CATEGORY/OUTLINE

Remote (cont'd)

on the gun trade. If the government were already part way toward control and monitoring of the wires and the crime and violence issues got emotional, such a measure might pass easily. The present concern ought to be with preventing the beginnings of such control. TASK 1: Examine issues of regulation of remote buying by TV and recommendations for any really useful regulation.

Expansion of remote buying in circumstances where the automobile is in decline and where business is frequently conducted from the home might lead to new use patterns for the highways. TASK 2: Check to see if in published studies there are any significant differences in patterns of goods movement from people movement. Why? Recommend statistical measures that would likely yield useful signals early about changing use patterns.

At the outset, it might do well to state again that the object of concern in this study is human settlements. For reasons of time, things that are only of national concern, things which don't explicitly concern communities are left out. At least I have tried to leave them out; some have crept back in spite of everything.

It does not seem likely that collection of taxes will be hindered by remote sales. TASK 3: The question of revenue-collection, remote sales and privacy deserves a more detailed look. What alternative situations are possible? How will various collection schemes impact present and potential "tax collectors?"

INITIAL CATEGORY/OUTLINE

Remote (cont'd)

KEYWORDS FOR PAGE(S):

Remote buying, Crime, Violence, Wire-tapping, Centralization,
Transportation planning, Taxes, Privacy

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Remote

A

INITIAL IMPACT ESTIMATE:

- A. Remote buying may encourage the development of "electronic banking" (buyers have their bank accounts billed automatically). This trend might be encouraged if numerous frauds are perpetrated. One pays in advance by signalling one's bank account. Even the simplest two-way system in cable television systems being installed at this date are capable of such transmissions from the home.

SCENARIO STATEMENT AND TASK:

The adoption of such systems would probably have some small effects on people's buying habits, depending on how the system was adopted and how quickly money was debited from accounts (immediately or with a purposeful time delay). These matters while important are outside the scope of this work. The scenarios fail to suggest new angles here.

TASK 4: This topic has already come in for attention. Beginning reading might include Dennis W. Richardson's Electric Money: Evolution of an Electronic Funds Transfer System (Cambridge: MIT Press, 1970), which contains an extensive bibliography as well.

Widespread adoption of remote buying and electronic banking seem likely to have impacts of the magnitude of supermarkets on cities.

INITIAL CATEGORY/OUTLINE

Remote

A (cont'd)

TASK 5: Work on this issue separately. Use IRAS and whatever resources can be brought to bear. Produce some public information or plausible alternatives, make sure it is readable, and get it distributed. If you care, work for what you think is right.

KEYWORDS FOR INDEXING:

Electronic banking, Money, Centralization, Supermarkets

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Remote

A1

INITIAL IMPACT ESTIMATE:

1. What would a major "blackout" do to the operations of the economic system if it were centered on New York and lasted a day or two?

SCENARIO STATEMENT AND TASK:

As brought out by Scenario Two, accidents may not be the only danger; guerilla action can damage systems. With large cities sensitive to disruption, power blackout is capable of causing lethal disruption, particularly in winter and particularly as reliance on electronic systems grows. There are other worries as well; suppose that the electronic funding system of the previous page had centralized files in New York (or elsewhere). What would happen to the operation on a nationwide level if the central memories were blitzed, for a few days or permanently. The consequences are enormous. If guerilla action is a possibility, it may not be possible to be failsafe enough. One might say that the chance that guerilla action might develop is too small to worry about; I suspect that decision analysis might show that a small chance of enormous disruption and possibly even enormous loss of life is too large a chance to take. Will people listen?

See the next two pages for further comments.

INITIAL CATEGORY/OUTLINE

Remote

A1 (cont'd)

KEYWORDS FOR INDEXING:

Money, Electronic banking, Guerilla action, Blackout, Centralization,
Disaster, Breakdown

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Remote

Ala

INITIAL IMPACT ESTIMATE:

- a. As human systems get larger, they frequently become more fragile. Failure of an electronic banking system, even for a short time, could conceivably have vast repercussions throughout an increasingly integrated national/global system. Likewise as a system becomes more complex, the probability of breakdown somewhere becomes more likely. Depending on the design of the national/global system (how it happens to come about), this sort of breakdown could be one of many.

KEYWORDS FOR INDEXING:

Disaster, Breakdown, Electronic banking

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Remote

Ala(1)

INITIAL IMPACT ESTIMATE:

- (1) The public might live with it until things are fixed
- (2) Things might decline until the megasystem "crashed", leading to a vast loss of life as services fail to be delivered; large cities are very fragile
- (3) An anti-technology movement might gain real strength, possibly hastening the result in (2), but possibly, if it grows more slowly, leading to a new vision of society entirely.

SCENARIO STATEMENT AND TASK:

The interaction with the anti-technology movement mentioned in Scenario Two is obvious. More than that it suggests that such a movement might not be entirely out of the question, A Butlerian Revolution might be more credible if increasing disorder was coming from the system without outside help; division in a society might also be helped along by possible government attempts to blame widespread system breakdown or malfunction on human villains. TASK 6: Write a few paragraphs on preceeding thoughts for appropriate journal or magazine (a management review? Time?). Wait for topic to come closer. Cultivate friendships with bankers.

INITIAL CATEGORY/OUTLINE

Remote

Ala(1) (cont'd)

KEYWORDS FOR INDEXING:

Butler, Samuel, Anti-Technology movement, Societal schism

THE END OF THE WORLD

Quite unexpectedly as Vasserot
The armless ambidextrian was lighting
A match between his great and second toe
And Ralph the lion was engaged in biting
The neck of Madame Sossman while the drum
Pointed, and Teeny was about to cough
In waltz time swinging Jocko by the thumb--
Quite unexpectedly the top blew off:

And there, there overhead, there, there, hung over
Those thousands of white faces, those dazed eyes,
There in the starless dark the poise, the hover,
There with vast wings across the canceled skies,
There in the sudden blackness the black pall
Of nothing, nothing, nothing-- nothing at all.

--Archibald MacLeish

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Remote

B

INITIAL IMPACT ESTIMATE:

- B. Potential for slightly deceptive practices perhaps higher than present. This might be particularly true where the product is sold from a remote location, outside national legal jurisdiction for instance. Should the communications system be responsible for the truth in its advertising?

SCENARIO STATEMENT AND TASK:

The question of truth-in advertising is brought in because of some of its impacts; the problem of regulation is itself a thorny one. Scenario one mentions economic hard times; if such problems begin to develop when government is doing its best to help business recover, how much attention will be paid? The track record is not good; only very recently has anything much more than lip service been paid by the FTC; as the act of trading becomes more intimately linked with the communications system, do the two regulatory systems collide? TASK 7: Produce some clear, cogent recommendations in this area, if possible. The political situation is so complex that only a finely tuned solution has a ghost of a chance. Note the trade-off between the urge to control this easy fraud and the dangers inherent in greater centralized control. Think about non-U.S. Federal ways of accomplishing the task; as scenarios indicate, the governmental situation may change. There may also be more efficient ways

INITIAL CATEGORY/OUTLINE

Remote

B (cont'd)

to do the job.

Although it is a bit off the track, it is also worth asking who will regulate truth-in-advertising when the programming originates here but is received and the product ordered in another country? TASK 8: What precedents, if any, exist in this area? Investigate newspapers because with the advent of cable operators, there will be many more small markets to police.

It also seems worth noting that in divided communities (or in any societies), it doesn't do much good to have high levels of mistrust. This is a small factor but so is a straw.

KEYWORDS FOR INDEXING:

Truth-in-advertising, Advertising, Trust, International problems, issues

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Remote

B1

INITIAL IMPACT ESTIMATE:

1. Unless frauds become extreme, the volume of commerce seems unlikely to be affected; new local institutions might develop in some circumstances to trade product information. Cable TV might be quite useful here.

SCENARIO STATEMENT AND TASK:

Whether such institutions develop depends, among other things, on mood. If, for instance, governments or even groups, are distrusted, such institutions may not have a great deal of utility. Instead, in such circumstances and if the problem is severe, the channels may be much more informal and fragmented. If groups can continue to get access to the media, such services may be presented to their own members or "kind". This may be a situation now; as community operated cable systems (or any systems) grow and attempt to present programming on this type of issue, the "whom do you trust" question must be faced squarely. Operators, take note. TASK 9: Do a little normative forecasting. What types of new institutions might work "best" for people in varying circumstances?

In an atmosphere where groups are growing and of importance, the ability to render such services may be important. If others are against the growth of these groups, this could be a battleground. TASK 10: What guarantees exist now, if any, for this type of access (requires

INITIAL CATEGORY/OUTLINE

Remote

B1 (cont'd)

fair amounts of media time at reasonable hours. Members of a community may be guaranteed a certain amount of media time each by law; can members of a group pool "their" time on a community-operated cable system for use for group services or spokesmen if station management opposes the idea? Media access is not essential to their success, most probably but seems both just and advantageous.

KEYWORDS FOR INDEXING:

Community control; Regulation; Access; Advertising

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Psych

A

INITIAL IMPACT ESTIMATE:

IT IS CLAIMED THAT TELEVISION INFLUENCES CHILDREN TOWARD VIOLENCE AND PASSIVITY. IF OUR IDEAS ON THE PRESENT PSYCHOLOGICAL IMPACTS OF TELEVISION ARE BOTH FRIGHTENING AND VAGUE, THE POSSIBILITIES OF THE FUTURE ARE UNDEFINED AND OF IMPORTANCE TO THE PRESENT.

- A. Suppose it is proved that television programming of the present types does contribute to violence and/or to passivity and receptivity.

SCENARIO STATEMENT AND TASK:

The author must tread cautiously on this ground. A hope is expressed that, when doing their research, experimenters control for culture and child-rearing methods; it does not seem beyond reason that in some circumstances television might have one effect and in another a converse effect.

It may be that in times of stress and conflict, the media's power is more to be feared. The news both influences children directly and through other programming. The impact is a common acceptance of violence and coercion as a norm.

Little can be said here of the direct impacts of such psychological side-effects. If television is helping to produce more citizens than

INITIAL CATEGLRY/OUTLINE

Psych

A (cont'd)

usual who think in terms of a happy ending and a simple, half-hour solution to problems, then our human settlements are in for big trouble.

It seems to me, for the nth generalization, that the problems of governing and of being a citizen are mounting, not even remaining the same. TASK 11: It is therefore of real concern to communities (or ought to be) to see just what impacts are now occurring. Research is now being done. Find out about it. Urge that it be supported to a greater extent and examine the results carefully (as this author has not yet done). A bibliography would be useful if you can find or create one.

TASK 12: Examine the work being done in England at the Joint Center for Planning Research, University College, London and the London School of Economics on the behavioral effectiveness of various media or media variations.

Might cable television encourage active response over passivity. Net effects would depend on the average program that a child watches.

KEYWORDS FOR INDEXING:

Television, Psychological impacts, Violence, Passivity

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Psych

A1

INITIAL IMPACT ESTIMATE:

1. Increasing levels of television censorship

SCENARIO STATEMENT AND TASK:

The probability for this type of action varies according to background. For some of the governments described in the scenario, it could be quite a tool. Some civil liberties outfits ought to get on the stick and study this while it is still mostly a possibility. TASK 13: How has censorship been worked before in varying circumstances? Applying various suppositions as to the network structure, programming production sources, and government forms, how might censorship be applied in this country? Can any safeguards be erected?

It seems to this author that the way to tackle this kind of problem first is to publish the findings and the particular nature of the problem and hope that solutions are adopted by the programmers or that televisions are thrown out by the viewers or by the parents of same. Where it will really begin to get sticky is in circumstances where the system (cable or school) is community-controlled and/or in circumstances where research findings indict the medium itself rather than the message. The conclusion of the task above ought to be recommendations for structuring the new communications networks so that conflict of this type is less

INITIAL CATEGORY/OUTLINE

Psych

A1 (cont'd)

likely to result either in an abridgement of First Amendment rights or in totally ignoring the problem. Because of the dangers involved and the great advantages of early action, I would assign a high priority to this task.

KEYWORDS FOR INDEXING:

Rights and freedoms, Censorship, Network structure

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Psych

A2

INITIAL IMPACT ESTIMATE:

2. If TV's contribution to violence can be conclusively proved, it may be a factor in planning new educational programming; will there be attempts to program citizenship in ways more sophisticated than presently in use?

SCENARIO STATEMENT AND TASK:

We may find local school districts or the producers of educational TV (companies, government units, universities) trying increasingly to create or destroy certain types of behavior patterns. It would seem that in economically or politically "up-tight" situations, this tendency would increase.

Reaction to this trend varies by one's faith in man's ability to conceive and structure better men. This point once again contributes to a recommendation to guarantee a really heterogeneous programming scheme where even the children have a choice of how to learn types of material plus other safeguards for diversity or, if such guarantees can not be convincingly demonstrated, to a serious reconsideration of the value of the medium.

What values might be worried about by the programmers? Honesty, good citizenship, obedience to instructors, efficiency in learning,

INITIAL CATEGORY/OUTLINE

Psych

A2 (cont'd)

perhaps (somehow) independence of thought, integrity, the goodness of the new, the goodness of the present, and/or love come to mind.

Some consequences of the "conclusive proof" are discussed on succeeding pages.

TASK 13 (cont'd): In addition, in what ways can/has/could an agency of any sort positively influence programming for a large segment of the population over time. If we are able to prevent that type action, what else will we be preventing?

KEYWORDS FOR INDEXING:

Values, Educational television, Violence, Heterogeneity, Educational planning

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Psych

A2a

INITIAL IMPACT ESTIMATE:

- a. Organized efforts to encourage certain types of behavior may result in producing those behaviors. Depending on the way in which the media are controlled, the results may be more or less heterogeneous. (It seems likely that the national government may have the greatest motivation and resource for such efforts and that the results may be desired to be homogeneous.)
- b. Such proof may result in greater control than presently exerted over broadcast content or at least an attempt to exercise such control; such powers, once established and funded, would of course be potent for other tasks.
- c. Proofs or alleged proofs of other effects of television may lead to a general anti-telecommunications feeling.
- d. Such proof may be ignored

SCENARIO STATEMENT AND TASK:

Looking over the scenarios and speculating that such a combination of wide educational use of media plus such research findings could occur in the eighties, there seems a fair chance that any of the above might occur. Other alternatives suggested:

- e. Related to "c". There may be a witch hunt against the perpetrators

INITIAL CATEGORY/OUTLINE

Psych

A2a (cont'd)

of the "brainwash of a generation", even attempts to link it to undesirable people or characteristics

- f. It may simply result in voluntary change of either the medium or the message
- g. By the time the proof has been introduced, verified and been made relatively undisputable, the media may have changed sufficiently to make application of the lesson difficult.

The size and danger of the reaction will depend on a number of variables including the depth of use of the systems and other previous threats and irritations.

TASK 14: As I go over some of the hazardous alternative futures that could arise from psychological impacts, it seems clear that unless they are planned for in advance and avoided somehow, a real lack of alternatives will show up later. The only piecemeal project which can sensibly be proposed is to find out sooner rather than later what the psychological impacts might be, if that is possible-- widespread use over a long period of time might be necessary before impacts show up.

In addition, it seems advisable that planning boards, programming organizations, buyers, and regulatory agencies make sure that a very strong case is made with full explication of risks before buying services. More on this subject in the general conclusions.

INITIAL CATEGORY/OUTLINE

Psych

A2a (cont'd)

KEYWORDS FOR INDEXING:

Psychological impacts; Network structure; Behavior control; Big
Brother; Socialization; Citizenship

THE LEADEN-EYED

Let not young souls be smothered out before
They do quaint deeds and fully flaunt their pride
It is the world's one crime its babes grow dull,
Its poor are oxlike, limp and leaden-eyed.
Not that they starve, but starve so dreamlessly;
Not that they sow, but that they seldom reap;
Not that they serve, but have no gods to serve;
Not that they die, but that they die like sheep.

--Vachel Lindsay

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Psych

B

INITIAL IMPACT ESTIMATE:

- B. What might be other psychological impacts of increased availability of communications channels? Might there be increased needs for privacy, increased levels of real satisfying human contact because of greater chances for finding compatible personalities, increased levels of alienation caused by a surfeit of sensation?

SCENARIO STATEMENT AND TASK:

These questions turn up no matter what scenario is placed in the background. Background is relevant, however. Put increased privacy needs against increasing population or alienation against social conflict and disorganization and the necessity of Tasks 14 and 15 become apparent.

TASK 15: What suggestions have been made to date for psychological indicators, broad measures and specific ones that might help us to know what is happening in this area: specifics on given types of "mental illness"; questionnaires given to "identical" populations at intervals for a statistically valid sample to check changes in response patterns over time, et al.

This task can not be efficiently executed at the settlement level; it is definitely relevant to this paper because the settlements may in

INITIAL CATEGORY/OUTLINE

Psych

B (cont'd)

many cases be planning and using the technologies that create the change. If no one else is doing this work and if many other vital research tasks are also not being done, it might be wise for the cities to put together their own research foundation which could then contract out to do research in the long term interests of the settlements as defined by them. More likely, more comprehensive but more compromised would be a Federal program on the behalf of American communities.

KEYWORDS FOR INDEXING:

Urban research, Psychological impact, Research, Indicators

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLIN

Name(s): SCE

Comp

INITIAL IMPACT ESTIMATE:

COMPANIES WITH SUCCESSFUL COMMUNICATIONS OPERATIONS WILL PROSPER

SCENARIO STATEMENT AND TASK:

This is of course a brazen generalization. It might not even hold up in principle under all circumstances. A nation makes war but war contractors go broke sometimes if the contracting structure is wrong or if the revulsion against war is sufficiently massive or if the companies become too dependent on the business and the war ends.

The scenarios and the discussion on earlier pages suggest the possibility of a pull back on communications technologies, even of an anti-technology movement of some force. There will also be companies who will founder for many more conventional reasons whether or not the anti-movement comes to pass.

This does suggest that communities with local comers in communications may not nearly have it made. Other reasons for this caveat appear later in this paper.

KEYWORDS FOR INDEXING:

Communications companies, Anti-technology movement, Economic base

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Comp

A

INITIAL IMPACT ESTIMATE:

- A. Increase in their economic, political influence which will increase their leverage on the areas in which they operate (and other areas as well).

SCENARIO STATEMENT AND TASK:

This may well be true in almost any circumstance. TASK 16: If you are an independent type and have such a corporation in your backyard, think and act before it does.

TASK 17: Study and work for ways in which corporate influence on government might be diminished. Things could always be worse.

I have devoted some little thought to the question of how corporate influence might be exercised in varying circumstances and have come to the conclusion that even if I had any answers worth repeating, they would not be tremendously germane to the general thrust of this work. Stay on your guard, community governments. Influence can be exercised with contractual clauses, regulations on equipment you buy, power over your tax base by companies who build plants in your area, and in other documented ways. Governments and communities ought to be figuring out ways in which they can exploit corporations; up-and-coming industry seems a dandy place to start. The author has no anti-industry complex;

INITIAL CATEGORY/OUTLINE

Comp

A (cont'd)

turnabout is fair play, however, and there is more to life than economic growth.

Scenarios suggest that in some settings of government decline, this corporate power could be extremely potent.

KEYWORDS FOR INDEXING:

Influence, economic and/or political; Communications corporations;
Government, local; Government, national; Political power

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Comp

B

INITIAL IMPACT ESTIMATE:

- B. There seems a fair chance that such companies may have more diffuse locational patterns than many of similar capitalization or products as they attempt to become showcases for remote operation.

SCENARIO STATEMENT AND TASK:

That one was pulled out of the author's hat. Locational analysis in general is a complex and little understood art; the structure of the new corporations is not clear. It does seem a reasonable supposition that if these companies are trying to sell new uses for new communications media, particularly real time communications, data transmission, and information manipulation, that they may try to become paragons. It is difficult to say how the scenarios might alter this prediction/possibility. Guerilla activity, bombs, pickets could lead to increased decentralization and isolation but that is guesswork.

The wealth and power implied by a rich booming industry may be more diffused. If the operations are in other countries as well, a distinct possibility, the new communications may export a lot of culture and American ideas about wage scales as well.

It seems likely that such a spreading would have marked effects on

INITIAL CATEGORY/OUTLINE

Comp

B (cont'd)

the corporate structure; such discussion is beyond the scope of this paper and is certainly at the moment beyond the scope of the author.

KEYWORDS FOR INDEXING:

Organizational structure, Location patterns, Communications corporations, Culture

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Country

A

INITIAL IMPACT ESTIMATE:

TECHNOLOGIES FIRST DEVELOPED IN ONE COUNTRY

- A. If production prices become cheap enough for a global market, this will probably improve the trade position of the selling country, assuming demand. Source of raw materials, components will be a factor.

SCENARIO STATEMENT AND TASK:

As is brought out above and by the scenarios, questions of international trade are going to be important. As the shape of the new industries evolves, we ought to be asking, from where do the raw materials come and how subject is the trade to political disruption? How much are local price levels based on total volume where large parts of that volume represent sales abroad and where price is heavily dependent on scale of production? If these types of vulnerabilities exist, what impacts might rises in domestic prices have?

KEYWORDS FOR INDEXING:

Trade, Prices of services, Price, increases

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Country

A1

INITIAL IMPACT ESTIMATE:

1. Changing trade patterns will influence role of cities as ports of entry and exit.

SCENARIO STATEMENT AND TASK:

Have no idea whether impacts or additional communications trade will be significant. It seems unlikely and, unless a really extreme effect, of limited importance to present planning.

KEYWORDS FOR INDEXING:

Trade patterns, Comparative advantage, Ports of entry for communications trade

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Country

A2

INITIAL IMPACT ESTIMATE:

2. The new communication technologies will in some ways probably create their own markets; exporting some advanced communications technologies could quickly create a demand for more. Installation of new networks and institution of spectrum engineering would create demands for new hard-and-software services.

SCENARIO STATEMENT AND TASK:

This positive feedback might not occur in some circumstances. If the technology for some reason were not suited for the importing country, it might worsen relations and lend itself to anti-technology movements. It is not really clear what our imports of the high-performance, high crash rate Starfighter aircraft to West Germany have done for mutual amity. See the next page also.

KEYWORDS FOR INDEXING:

Trade patterns, International relations

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Country

B

INITIAL IMPACT ESTIMATE:

- B. Communications technologies are likely to continue to be powerful cultural export devices and possibly homogenizing influences, particularly in the first surge of development.

SCENARIO STATEMENT AND TASK:

I am not positive that the cultural wave will not be from Japan to us, for instance. Its power will depend on the extent that software (programs) comes from another nation; a secondary, related impact comes from travel (See page 160.)

Although the major topic here is international movement, the homogenizing influence could as well apply to settlements within a country. It has often been speculated that cities all over the world are on the way toward all looking and being just about the same.

It intuitively seems that heterogeneity, cultural and physical differences, is/are an important part of the quality of the life in a country. Who is in a position to make judgment on what kind of heterogeneity there ought to be? Who can even make a measurement that, when trumpeted, could or would be acted upon?

Nonetheless we press forward. TASK 18: Study the work of Kevin

INITIAL CATEGORY/OUTLINE

Country

B (cont'd)

Lynch and others and speculate as to whether adequate running measures of physical and cultural homogeneity can be set up. If so, then begin to study the realities of the execution of a publicity project on the theory that, if people are losing something, they ought to be told.

Ironically, higher levels of international conflict will probably lead to lower levels of exchange and/or to more protection of local ways; this normally undesirable condition does have some commendable aspects.

KEYWORDS FOR INDEXING:

Heterogeneity, Culture, Trading patterns

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Country

B1

INITIAL IMPACT ESTIMATE:

1. After initial export phase, a reaction might include movement toward heterogeneity

SCENARIO STATEMENT AND TASK:

This trend, as noted above, might be strengthened in times of conflict or when technology was being called into question. It seems likely in any case although the form may vary.

No additional recommendations.

KEYWORDS FOR INDEXING:

Trade patterns, Culture, Heterogeneity

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Advert

A

INITIAL IMPACT ESTIMATE:

INCREASING SKILLS AND ELECTRONIC TOOLS FOR CREATING POTENT ADVERTISING.

- A. Any discontented person will possibly find difficulty in locating someone who can do something about his problem. Present movement seems to indicate that within a decade, people may be receiving their television directly from satellites. As the system turns global over the next several decades, there may or may not evolve regulations permitting one national government to regulate or censor what its people see. This author is beginning to get a bit out of his depth when he speculates that such regulation may be technologically and politically difficult to implement.

SCENARIO STATEMENT AND TASK:

This type of problem could go different ways. I have excised some speculations originally in a draft about the nature of such evolutions. No present action on the settlement level is called for because none (that this author can conceive) would do any direct good.

Because some of the possibilities involve international stickiness (like one of our Comsats getting shot down by unfriendlies, justly or unjustly upset by mirages on the vast wasteland), the Federal Government and the ITU are advised to anticipate this problem before it becomes a problem. The advertising question jibes nicely with a number of questions

INITIAL CATEGORY/OUTLINE

Advert

A (cont'd)

involving propaganda, deceptive practices, and pornography and investment of effort would probably actually yield a fair return for the research. A nation that needs all the trade and diplomatic cooperation it can get is well advised to act early to salve potential sorespots; in a similar manner, nations that don't wish to be bombarded by 'hostile' propaganda and programming may have to take some steps.

In times of really high domestic conflict and division, there may exist the possibility of media warfare. TASK 19: Imagineer ways in which communications technologies could be used as "weapons in our human fight". How do we guard against that in their design? What are the tradeoffs?

KEYWORDS FOR INDEXING:

International relations; Advertising; Satellites, communications;
Comsat; Weapons; Conflict

SOCRATES

There was a fellow who always was right

Just because he wasn't so bright

To each question they'd throw

He'd reply, " I don't know..."

And indeed he always was right. .

SCE

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Advert

B

INITIAL IMPACT ESTIMATE:

B. Holographic advertising may create its own set of problems, this time for localities as well. Although the technology has not yet been perfected, cities may be faced with still or moving, giant or miniature, three dimensional images in the sky, in the streets, inside stores. Because of the economies, large cities may be the first to see this new art form. It would seem that some problems of health and safety would be involved: distraction for drivers is an obvious example if private cars are in use when this system is introduced.

SCENARIO STATEMENT AND TASK:

No action recommended. Exact format may vary in different circumstances. More importantly, there is little need for advance action and agendas are crowded. Action must be taken before large capital investments are made in equipment unsafe for the public. In a year or three, it will be time for the Federal Government and other agencies to seriously study the technology.

KEYWORDS FOR INDEXING:

Holography, Advertising

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Business A

INITIAL IMPACT ESTIMATE:

TELECOMMUNICATIONS TECHNOLOGIES DEMONSTRATE USEFULNESS WITHIN
BUSINESS (PICTUREPHONES, CHEAP REAL TIME HOLOGRAMS, FACSIMILE,
DATA)

- A. More and more communications facilities may be built into
new structures for business

SCENARIO STATEMENT AND TASK:

At first glance at least, the only requisite public action at
present is normative study to insure that new public buildings are fully
equipped and that regulatory standards are adequate. TASK 20: Are
new building standards necessitated: Devise national model legislation
for local use in building code reformation.

The whole question of the influence of different shapes of communications
networks on performance and personal outlook is largely unworked ground.
The more the new media become all-pervasive, the more important such
studies become. TASK 21: Business ought to sponsor such research if it
does not at present. These new networks are in their future and as noted
will likely have large impacts on their practices and efficiency. The
public can not afford to leave it at that, however, since results of
such studies will presumably be proprietary for some time.

INITIAL CATEGORY/OUTLINE

Business

A (cont'd)

Further speculation on the impacts of new communications patterns on business are beyond the scope of this paper. The possibilities and influence of increased efficiency, greater centralization, increased corporate espionage, and new organizational forms will eventually have impacts on cities. TASK 22: Government should find out as much as possible about business communications networks and vice versa; they may find themselves mutual enemies some decade; in the meantime, their interests are not identical. Perhaps larger investments in "privacy technology" will result from such concern.

KEYWORDS FOR INDEXING:

Business, Internal communications, Architecture, Information networks, Network structure, Privacy

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Gen Ed

A

INITIAL IMPACT ESTIMATE:

USE OF THE NEW TECHNOLOGIES IN EDUCATION

A. If the price is right, educational programs could have easy access to a wide variety of expertly prepared educational programs.

1. Depending on the price, this could leave traditional teachers or program administrators with the resources and time to develop unique programs of their own.

a. Use of this time could be devoted partly to a study of the home community on many levels.

SCENARIO STATEMENT AND TASK:

Statements such as the above roll rather glibly off the tongue. First item on the agenda-- TASK 23: Talk to some teachers familiar with present material and future possibilities and try to invent ways to make the above happen. Is the teacher really saved all that much time? What other possibilities exist?

Unions may take advantage of the extra time to press for shorter work days; I recall from my younger days a number of teachers complaining of the long hours and have seen the truth of the point. The result of a trend to shorter hours could well be the opposite of that intended: a more homogeneous, automated education and the teacher as technician--

INITIAL CATEGORY/OUTLINE

Gen Ed

A (cont'd)

leading to greater union strength along with the alienation, most likely.

This seems to the unaided eye to be a real fork to alternate futures.

TASK 24: If the prospects look good, plan the unique resources angle before the electronics of cable and cassette are put into wider use. Look at how they might be used. I must add that there is no evidence that automated, homogeneous machine teaching with human assistance will not be superior in most ways to the education that many children receive presently. This is no time for slogans.

The question of the impacts of students investigating the home community will be examined later in this work.

The "unique resources" approach may prove helpful in taking advantage of conditions.

Scenario One postulates a time of "creative heterogeneity" followed by a collapse to extreme conformism; the educational schemes of the eighties could encourage or deter that sort of shift.

KEYWORDS FOR INDEXING:

Education, general; Unions, education; Education and community;
Education, unique resources approach

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Gen Ed

A2

INITIAL IMPACT ESTIMATE:

2. For many reasons, the organizational structure of education may undergo fairly basic changes over the next twenty years: population shifts, new philosophies, basic community attitudes, new technologies, new cost structures, supply of teachers, need for various types of education, growth of leisure time, and new planning techniques. By making available high quality basic instructional materials at reasonable prices, the new communications technologies could have quite an impact on the change. No single agency is likely to play a deciding role in determining the exact nature of the future however. We will therefore leave it for the moment by stating that education may become less based on physical structures, that the nature of private and parochial schools may change, and that "public" schools have perhaps the greatest potential for change, depending on the attitudes of the home community and on national trends in public education.

SCENARIO STATEMENT AND TASK:

The scenarios bring out some additional points. The schools may also become battlegrounds (more than today with busing) as various forces strive to make sure that their own brand of education is supplied or

INITIAL CATEGORY/OUTLINE

Gen Ed

A2 (cont'd)

required. It is the latter that could be a real stumbling block unless a convincing policy is invented. What shall children/students be required to learn and who will supply that learning? Due to the civil rights movement and its offshoots, the number of black teachers in all schools is slowly on the upswing. But who will film the cassettes and lectures? If schools have a number of lectures on the same subject (choose the lecturer and bias you prefer), will all programs be acceptable? If the conflict levels continue to rise, these could be real problems in a few years. TASK 25: What sorts of initial organizations might help to guarantee some sort of diversity of choice while maintaining original goals; in what sorts of situations might the conflict be direct and irreconcilable? Depending on your point of view, how ought that sort of situation be prepared for?

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Gen Ed

A3

INITIAL IMPACT ESTIMATE:

3. These changes might include increased use of computer programs. Although many educational institutions cannot afford sophisticated hardware and software, access to such is becoming less expensive (or at least such is my impression; I have had no chance to research this point). Even home-based education will have access to computers via the new design of touch tone phone (twelve keys).
 - a. Wide availability of interactive computer-based educational programs will be another force acting to reform educational structures.

SCENARIO STATEMENT AND TASK:

The same problems that cause regional blackouts could overtake computers that are linked to too many customers; it seems doubtful at this stage of computer development that consequences would reach blackout proportions. If the computers get a good deal larger (in terms of units served) or become mutually interlocked (a proposal which has been discussed), they and the region become more vulnerable to an increasing incidence of breakdowns and to sabotage.

Large computer investments can render an educational program considerably less flexible as well. This force would be particularly

INITIAL CATEGORY/OUTLINE

Gen Ed

A3 (cont'd)

potent in times that are not change-oriented; it would reinforce stagnation.

Central programs may be more vulnerable to attempts at centralized control by legitimate authority or illegitimate. Indeed, computer education could be a focus for discontent against the government (Scen. 2, 1990).

These are some of the forces that such programs might bring to bear.

The influence of the computer will probably be toward centralization, at least at first and the length and depth of that will be determined by factors such as the speed of development of programming as a skill as widely known as writing and of cheap, powerful, small computers. If the schools press for them and the technology is there, the influence need not result in greater centralization but in more powerful methods and flexible diverse resources at the command of the users.

KEYWORDS FOR INDEXING:

Education; Computers, Centralization, Sabotage; Scale, human;
Flexibility

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Gen Ed

A3b

INITIAL IMPACT ESTIMATE:

- b. Using old-fashioned mail or new television channels for their data-carrying the correspondence schools can potentially take good advantage of communications technologies and a possible movement toward home-based activity.

SCENARIO STATEMENT AND TASK:

Scenario One:

This movement might be strongest going into the nineties as the nation becomes fully wired and the automobile congestion promotes full use of communications capacity. If technology change and the move toward more leisure time continue, people will probably be in the mood to continue their educations right on through their lives and frequently will want to do the learning at home; this would be in tune also with trends toward sexual equality. One partner might be learning at home and taking care of children while the other works outside or both may be able to work at home.

Scenario Two:

The movement might peak earlier in the heterogeneous eighties; by the nineties as conflict levels rise, it might be on the wane again.

Federal regulations may be necessary to control and certify the

INITIAL CATEGORY/OUTLINE

Gen Ed

A3b (cont'd)

industry. TASK 26: What alternatives are available? What might result if there are no controls or certification, in various circumstances? It will be in the interest of the communities though to see the law enforced; they will also have to consider thoroughly how correspondence courses, privately or publicly run, can contribute to their educational goals.

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Ed Kind

A

INITIAL IMPACT ESTIMATE:

- A. In areas with a sufficient concentration of young children, the new visual media might serve to create prekindergarten or preschool atmospheres in daycare centers.

SCENARIO STATEMENT AND TASK:

The need for concentrations comes from the purchase of the capital equipment; programming can be widely broadcast.

The form of the programming in different circumstances could vary from moving colored patterns to Sesame Street to fifth grade literature to indoctrination. TASK 27 (In combination with other suggested applied psychology work-- Tasks 11, 14, 15, and 21): how might such programming affect younger children? TASK 28: Sketch various kindergarten technologies that conform to cost-effectiveness constraints; how many people are eliminated? The impact of such movements for better or worse falls on the children and also on the employees. It may be that the most cogent reason for not "increasing productivity" at this level is that to have people employed at doing this sort of work fits in with society's goals. I suspect that for most people it beats the assembly line and the file cabinet; most people may even be able to learn to be good at it. While you are at it, make similar speculations about other sorts of educational institutions.

INITIAL CATEGORY/OUTLINE

Ed Kind

A (cont'd)

Many of the situations sketched in the scenario suggest that the "productivity" emphasis may be followed and in some cases even the "indoctrination" emphasis. TASK 29: When doing work to protect diversity by designing systems "against centralization", make sure that preschool institutions are covered. The main impact in this area can only come from a broadly-based, forward-looking approach to planning. Many of these problems, if anticipated, can be minimized. People may not want to minimize them or even consider them problems; that is also a possibility. Much (almost all?) of the preschoolers' education would come at home with some fraction via video. What might be done to technologies at that level? Include this in Tasks 27 and 28.

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Namd(s): SCE

Grade School A

INITIAL IMPACT ESTIMATE:

USE OF CABLE, OTHER NEW TECHNOLOGIES IN GRADE SCHOOLS

- A. Might lead to earlier reading skills, other improvements in teaching of skills, preparing way for earlier, personal teaching of advanced material, skills, and processes and to student initiatives

SCENARIO STATEMENT AND TASK:

This has been predicted often enough. It really seems an area where the technology might be used to advantage, very analogous to the language laboratory of many of today's schools where students learn new languages through preprogrammed taped material in conjunction with books and individual aid when necessary.

It seems the planning format, the cost of technology and system reaction will be more powerful in determining utilization than the scenario factors. An anti-technology movement or other side-effects might have large interactions with this system, however.

KEYWORDS FOR INDEXING:

Education, Grade school, Planning

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Grade School A1

INITIAL IMPACT ESTIMATE:

1. Economic benefits should accrue to areas which can first improve their educational programs, from the families and companies that decide to move to the area; there will be long term benefits if such grade school students turn out to be more skilled, better bureaucrats, have greater initiative(?) or whatever. Of course, there would be long term disbenefits if the effects were alienation, lesser initiative, or whatever.

SCENARIO STATEMENT AND TASK:

The perception of factors such as these will probably put pressure on schools for early adoption of the newest technologies regardless of benefits, just as other districts will reject the idea because of its newness, regardless of benefits.

If people no longer attach such importance to formal grade school education, those first economic benefits will not appear.

KEYWORDS FOR INDEXING:

Economic benefits, Education, Grade School, Planning, Comparative advantage

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Grade School B

INITIAL IMPACT ESTIMATE:

- B. Use of telecommunications might lower costs in some cases;
in the eyes of this author, the case for cost-effectiveness
is not so clear as it is for universities or secondary
schools. More effective education per dollar does seem possible.

KEYWORDS FOR INDEXING:

Cost effectiveness; Schools, grade

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Grade School B1

INITIAL IMPACT ESTIMATE:

1. Wide adoption of such systems would probably occur, resulting in greater potential for teaching whatever themes the curriculum (explicit and "hidden") contains: citizenship, initiative, obedience, creativity(?), responsibility. The success or the failure of such teaching will inevitably impact the cities.

SCENARIO STATEMENT AND TASK:

Even cost-effective systems are not always adopted in all circumstances nor are they adopted at equal rates for equal worth. The value systems in play, the success of systems in other areas, the initial cost will all play parts in the decision-making process. As scenarios indicate, the economic status of the country, biases toward or against technology and centralization, and even the form of government will play roles in determining the possibility of system adoption.

No additional recommendations for tasks or projects.

KEYWORDS FOR INDEXING:

School, grade; Cost effectiveness

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Sec School

INITIAL IMPACT ESTIMATE:

TELECOMMUNICATIONS IN SECONDARY SCHOOLS

SCENARIO STATEMENT AND TASK:

Specific uses of technologies include lectures taped elsewhere and/or elsewhere; laboratory demonstrations; graphic demonstration of materials not previously available (e.g. computer simulations of the visual effects of traveling at near light speeds); use of the school's telecommunications equipment as instructional aides for learning about telecommunications theory and operations; access to central computers for classes and school management information systems; correspondence courses.

KEYWORDS FOR INDEXING:

Secondary schools, Technologies

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Sec School A

INITIAL IMPACT ESTIMATE:

- A. Availability of basic programming via cassettes and cable might eventually lead to a non-facility-based vision of schooling and possibly making available a more varied and heterogendous educational program for any given student. It may also lead to increasing homogeneity as more and more of the pupil's time is taken by coursework that not only in basic content but in detail is the same everywhere. Both seem possible.

SCENARIO STATEMENT AND TASK:

The principal immediate determinants seem to be policyand planning decisions and the basic attitude of the teachers.

Behind those factors may lie the state of the economy, trends in school costs, income of teachers, current attitudes toward innovations and toward teaching as profession. It seems, looking at the scenarios, that homogeneity/heterogeneity question would be settled differently in each; it is difficult to rigorously back that up, however, nor do I believe that there is a real need to. Schools ought to decide what they want now and work towards those goals, realizing that forces may develop to push in the opposite direction. TASK 30: A better sort of educational inventory (set of indicators) is probably necessary to gauge something as amorphous as "heterogeneity of educational opportunity."

INITIAL CATEGORY/OUTLINE

Sec School

A (cont'd)

KEYWORDS FOR INDEXING:

Schools, secondary; Heterogeneity/homogeneity; Planning, goal-oriented

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Sec School B

INITIAL IMPACT ESTIMATE:

B. More technical, skill-oriented types of education facilitated.

Special physical facilities will probably continue to be necessary for most activities but expert teaching can be provided from a distance in space and time, both to specialized and standard secondary schools.

SCENARIO STATEMENT AND TASK:

The caveat for this assessment is basically concerned with costs: how much will the electronic methods save (not necessarily the only factor but the one which by far would be weighed most heavily by school boards at present). If "too" much is saved and teachers feel really threatened, they may have enough muscle to quash the adoption of the new technology, regardless of its other merits or demerits. The perceived threat may be to their self-image as professionals or to their social system.

TASK 31: the sooner schools begin to evaluate these possibilities, and make some preliminary long range planning decisions, the sooner they can incorporate those decisions (which may be to prepare for several eventualities) into the architecture of new facilities.

TASK 32: When working for the educational indicators of TASK 30,

INITIAL CATEGORY/OUTLINE

Sec School

B (cont'd)

include some that measure both the character of the average curricula and, somehow, what that curricula really teaches. The purpose, among other things, is to get a handle on possible shifts like the "skill-oriented" one mentioned above.

KEYWORDS FOR INDEXING:

Schools, secondary; Specialization; Skills

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Sec School

B1

INITIAL IMPACT ESTIMATE:

1. Trade/correspondence/vocational schools would benefit particularly from the skill-oriented strength of the new systems. There may be a trend running in that direction in schools anyway; even in public schools, this may continue and expand, perhaps at the expense of more abstract pieces of learning.

SCENARIO STATEMENT AND TASK:

If it is indeed to be a buyer's market, then the mood prevailing at any given time will determine what is emphasized. Still a bias toward the skills seems likely; the equipment is somewhat expensive and it probably would have high productivity for those kinds of uses. If adopted widely, it would probably make skills more attractive than others, ceteris paribus.

It seems likely that correspondence schools (and their societal benefits and costs) would thrive and starve at different states of the economy. Probably a rising economy with a Horatio Alger ethic in the air would tend to be most encouraging.

KEYWORDS FOR INDEXING:

Schools, secondary; Schools, vocational; Schools, correspondence;
Skills

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Sec School C

INITIAL IMPACT ESTIMATE:

- C. Impact of telecommunications, fewer pupils, teacher unions, and increasing costs could well combine to produce a new vision of the role of the physical facility of the school as a learning and action center for the geographic community, for instance.

SCENARIO STATEMENT AND TASK:

What follows is just one view of how the conflict outlined immediately above might turn out. It seems fairly clear that schools particularly secondary and post-high school, are heading into a period of conflict, and perhaps large change. I hope that local boards keep an eye on the main goals from which I would expect results that would at least parallel the "new vision" outlined in this section. Each in their own ways, the groups involved will probably fight the threatening change and so fight one another. How that battle will end is an unfinished sentence.

It should be remembered that the technologies may not be adopted over the next twenty-five years, that economic shifts could change the cost picture, and other changes could occur that would lessen the possibility of any such "battle" occurring.

In times heavily anti-government, the telecommunications leading to central banks and government broadcasting centers could further the

INITIAL CATEGORY/OUTLINE

Sec School

C (cont'd)

school's image as "the heart of the beast," a result quite far from any idea of a community center.

KEYWORDS FOR INDEXING:

Schools, secondary; Architecture; Societal conflict, Community center

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Sec School

C1

INITIAL IMPACT ESTIMATE:

1. Such a shift would have an influence on the architecture of new "school" buildings
2. If the current image is too strong for real change, the physical plant of the schools could be a real drag on already over-burdened local budgets
3. If the shift does occur, the "schools" could probably easily provide physical facilities for lifelong continuing educational programs
 - a. Total cost of education/pupil would tend to be reduced
 - b. Benefits to community would be increased as well as benefits to individuals
4. A small probability exists that such pressures might prove decisive in advancing local use of goal-oriented decision making procedures.

SCENARIO STATEMENT AND TASK:

The initial changes in architecture will probably be minimal; at least those changes directly traceable to the media probably will be. They might include studios, built-in closed circuit hookups, and cassette libraries. The other trends, if they continue, will also have an impact in opening up the form and insuring that school furniture

INITIAL CATEGORY/OUTLINE

Sec School

C1 (cont'd)

and drinking fountains are sized for continuing education programs, for instance. TASK 33: The sooner boards start studying this type of change, the sooner they'll begin to get some answers. I suspect that the changes will occur because they will probably result in savings; continuing education that is based in the schools (for broadcasting, classes or both) will result in fuller use of the capital plant, for instance.

Trends and fads in architecture may be enough to wipe out any observable trace of the impacts above. An economic downturn could lead to no building at all. TASK 34: Get your school district to consider designs both technology-compatible and highly flexible. Remind them it is being designed for use beyond 2001.

KEYWORDS FOR INDEXING:

School, physical plant; School, secondary; Continuing education; Planning, goal-oriented

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Sec School D

INITIAL IMPACT ESTIMATE:

- D. Schools may normally gain access to more specialized material than they can presently. Classes may well be smaller with the major instructional materials coming from central libraries of tapes and books. This is only a statement of potential

SCENARIO STATEMENT AND TASK:

It is the suspicion of this author that, if the new technologies do spread in other ways through society, that their cost, pervasiveness, and versatility will lead to wide use in the schools, unless still other factors (including policies and actions taken now) intervene. (See rest of education sections).

KEYWORDS FOR INDEXING:

Education, secondary; Education, specialized material

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Sec School

D1

INITIAL IMPACT ESTIMATE:

1. Those who control curricula may choose to tap educational resources that they believe will give them the type of labor force or image of citizenry that they desire. The same argument would seem to stand no matter who exercises control unless the curriculum selectors are the secondary students themselves.

KEYWORDS FOR INDEXING:

Labor force; Education, secondary, Curriculum

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Sec School E

INITIAL IMPACT ESTIMATE:

E. Other direct impacts on curricula include

1. There will be a need for teaching about operations and use of the new communications technologies themselves. The magnitude of this demand is uncertain. It seems likely that some curriculum alterations will be forthcoming; the schools have not really caught up to television so the timing is not clear. On the other hand, just as high schools have trained student audio-visual staffs to run their projectors and recorders today, so they will very likely train students tomorrow.

Likewise, if communications-based electronic library technologies are adopted to expand local resources by permitting access to remote collections, students will have to be taught the use of the systems. These information-gathering skills will have their impacts on data flow and use in the communities as the students graduate.

2. Communications links to teaching computers should bring improvements (?) to the teaching of mathematics, history, even reading. The teaching of geography in particular may potentially be much improved by new direct access to compelling images of the far away and displays of patterns to be found in the nearby.

INITIAL CATEGORY/OUTLINE

Sec School

E (cont'd)

- a. Depending on how the teacher is involved and on other factors, the results of the educational process will vary. It is by no means a settled issue that high technology leads to a superior (or inferior) education.

SCENARIO STATEMENT AND TASK:

There are no tasks or scenario-influenced suggestions from me.

Any ideas?

KEYWORDS FOR INDEXING:

Education, Sec; Curriculum; Communications Technology, Courses
in operation of; Computers, teaching

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Sec School F

INITIAL IMPACT ESTIMATE:

F. Depending on the policy adopted and the particular timing, availability of public school or college programming, even at cost, could have a great impact on the viability of private and parochial schools.

Nonpublic schools could be aided by educational programs that enable them to be more cost-effective. They could conceivably be destroyed by high prices or by public programs, that were of high quality and/or heterogeneous enough (e.g. religious programs of all types available in public schools).

SCENARIO STATEMENT AND TASK:

In ways that probably are presently unpredictable, economic viability of the programs will be affected by increasing costs for people and, possibly, equipment. The relative usage of various educational technologies (including traditional ones) will also be affected. Planning officials should be alert to emerging trends in these areas.

If parochial schools go under, there could be a real reaction which would be quite in tune with any anti-government or anti-technology feelings running.

INITIAL CATEGORY/OUTLINE

Sec School

F (cont'd)

KEYWORDS FOR INDEXING:

Education, secondary; Education, public; Education, private;
Education, parochial; Education, planning

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Univ

A

INITIAL IMPACT ESTIMATE:

USE OF THE NEW TECHNOLOGIES IN UNIVERSITIES, COLLEGES AND
JUNIOR COLLEGES

- A. If certain lecturers were taped and the subjects distributed at low cost, small colleges could afford a higher quality of general lecture and be free to devote more resources to unique topics

SCENARIO STATEMENT AND TASK:

There may not be enough unique topics around to enable each school to specialize and attract enough students to survive, even if producing their own cassettes. On the other hand, applications for admission may be more dependent on other factors: geographic propinquity, quality of campus environment, record of the lacrosse team, or other unforeseeables. TASK 35: Design a study, if possible, that might give some indication of whether small or large colleges and universities could survive under the postulated new conditions.

Another alternative is that the production of cassettes and cable broadcasts may never get started in a large way. The only long term deterrent, aside from changes in attitudes toward this specific technology's usefulness or toward technology in general, is a cost factor. Most universities and colleges would not be properly equipped to either

INITIAL CATEGORY/OUTLINE

Univ

A (cont'd)

make tapes and broadcasts or to receive them. As the financial crises of educational institutions deepen (if it goes as expected), either the government, educational development banks, or private operators may see it as a profitable move to supply initial capital. A communications corporation could possibly work with a multiple college consortium to share resources. Networks of small size, two to five colleges for instance would be formed initially, but once started and if proven useful, the exchange would seem certain to widen.

TASK 36: Universities and colleges ought to begin studying the virtues, faults, and technological futures of these innovations. If useful and if the price is right, they may both save some institutions from turning to the resort business and improve the quality of the education offered at each. Neither is certain and the alternatives need an intense look.

KEYWORDS FOR INDEXING:

Education, university; Cassettes, education distribution and sale;
Education, university, planning.

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Univ

A1

INITIAL IMPACT ESTIMATE:

1. Such a market might encourage the marketers (possibly the university in most cases since they would have the equipment and facilities necessary for taping and information management) to specialize and spend a great deal of resources on the export of subjects.

SCENARIO STATEMENT AND TASK:

Universities may steer in this direction as a community involvement and income source. They may not become involved heavily because of a resurgence of the ivory tower ethic or a lack of success in initial ventures.

TASK 37: Keep tabs on this trend; it seems an important "leading indicator" for the possibilities discussed below.

KEYWORDS FOR INDEXING:

Education, university; Specialization; Education media, who produces;
Indicator

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Univ

Ala

INITIAL IMPACT ESTIMATE:

- a. This may lead to a decrease in the demand for the lecturing services of a number of faculty members. If costs of education go up and the costs of electronic lectures are low, it may lead to a reduction of staffing. It will more certainly lead to a redirection of faculty time with less time being devoted to lecturing. The ultimate effects on the educational process are unclear to this author but seem likely to be of major importance.

SCENARIO STATEMENT AND TASK:

It should be repeated every so often that the statements being made here are not predictions; they are statements of what seem to the author to be plausibilities. The event chains are constructed solely to provide clues for thought about present action.

As in the secondary schools, the ultimate impacts of the adoption of these technologies will depend largely on the way in which they are adopted. Universities seem in some cases to be groping for some answers in these areas already. This is a good sign, not because they are close to any resolution, but because in some small, peripheral ways they have begun to think about the problem. To my eyes however, they seem as far away from goal-oriented planning as other systems in almost every case.

Comment?

INITIAL CATEGORY/OUTLINE

Univ

Ala (cont'd)

Impact Ala above may choose not to occur in either way stated for a number of reasons. First, as previously implied, at any point the technology may just cease to spread. Second, if the amount of "ground" that universities try to cover and the competition in which they engage increases, faculty lecturing may well remain constant in time volume but increase in scope: over time, a faculty member may spend as much time lecturing but on a larger number of subjects, many of them esoteric. Third, faculty may just teach smaller classes. Fourth, faculty may spend less time in the university and be paid less, working also for the new educational institutions on a consulting/part-time basis.

Societal factors suggested several of the alternatives above and societal factors will determine which will be predominant. For the system to work, faculty will have to put more conscious effort into making the lectures better teaching devices since, unless the media is two-way live TV, there will be a need for anticipation of questions.

The whole question of salaries makes the questions above basis for faculty/administration/student conflict.

No Task recommendations; see recommendations throughout beginning of this section.

KEYWORDS FOR INDEXING:

Education, university, faculty work load

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Univ

Alb

INITIAL IMPACT ESTIMATE:

- b. With a lot of electronic courses on the market, "local" faculties can become more specialized in unique areas as fewer resources are devoted to "basic" materials. This uniqueness may enable local schools to more effectively compete for students. (It should be reemphasized at this point that this impact is seen as a possibility, not even necessarily the most likely one in all circumstances.)

SCENARIO STATEMENT AND TASK:

Possibilities such as this and those on succeeding pages point up the need for students, faculties, and administrations as well as secondary consumers of the benefits of education to begin to consider the implications of such potential changes.

TASK 38: How might such a shift to "unique resources", if viable, take place and what educational formats might result?

TASK 39: What impacts may it have on the concepts of education in use? What sorts of hidden curricula are implied? What happens when a university with thirty departments begins to meet the forces demanding that it have expertise in only two or three?

INITIAL CATEGORY/OUTLINE

Univ

Alb (cont'd)

TASK 40: Research presently feasible can probably begin to answer some questions about the efficacy of new electronic methods. Some has already been done. These programs need to be intensified and broadened. There is a real time factor here; the cable, cassette and computer technology will bring real pressure to bear within ten years, most likely (see Appendix II).

In addition, other forces, notably competition from other new educational institutions, financial pressure, demands for greater efficiency in teaching (possibly caused by growing trends to get out into the community), and changing age levels of pupils (possibly changing to a broader range of ages) will be bringing pressure onto existing structures. Into this some ideas, ideals and operational purposes might bring order enough to make decisions. TASK 41: The United States Office of Education or an educational association might keep aggregated records of the growth of electronic courses and the number of departments at a school. Both are necessary; we may even see a growth in the number of departments and faculty even with an increase in electronic courses. It seems likely for a while that some manpower will be needed to run each subject. As the number of subjects increases (if it does), the number of departments may actually rise; if the programs are frequently live and question/answers are taped this may not occur as much. Other alternatives are discussed below. The point which must not be lost is that this entire discussion has at its base

INITIAL CATEGORY/OUTLINE

Univ

Alb (cont'd)

the quality of the community's educational systems.

KEYWORDS FOR INDEXING:

Education, university; Indicators, educational; Unique resources

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Univ

Alb(1)

INITIAL IMPACT ESTIMATE:

- (1) "Unique" schools will likely wish to interconnect via electronic media to exchange more deeply developed resources. The exchange may well be between universities and other types of institutions, some educational, some places of work, some governments. As the means of exchange become more sophisticated, small discussion groups with members scattered geographically become more likely and more desirable. Increasingly sophisticated techniques will be necessary to inform students and faculty of class possibilities; billing techniques will also need to follow suit to make this possibility real.

SCENARIO STATEMENT AND TASK:

The interconnection described here and on subsequent pages may not occur and therefore negatively impact the unique "resources" themselves. Some of the potential difficulties are implied above: billing, matching, institutional difficulties. Changes in economics or in the political structure may also modify this trend; if there is increased sensitivity to long range communications on account of invasions of privacy, theft of signals (bootleg courses), of high power prices (ecological sensitivity may militate against conspicuous use of power even if the economics of the matter are viable), the patterns may be quite different. Planners

INITIAL CATEGORY/OUTLINE

Univ

Alb(1) (cont'd)

should be alert for surprises. Flexibility is most important in education.

KEYWORDS FOR INDEXING:

Education, university; Unique resources; Information networks;

Institutional links

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Univ

Alb(1)(a)

INITIAL IMPACT ESTIMATE:

- (a) Such linkages may well be followed by structural links, temporary campuses and widespread changes in the physical shape of learning.

SCENARIO STATEMENT AND TASK:

One potent factor in determining the shape of this change, aside from others mentioned earlier in this thesis, will be the attitude toward small v. large systems. It may be felt on the one hand that temporary links and large networks, forming such shifting and temporary patterns, are viable and creative. A second possibility is that smaller institutions, more permanent in nature may be felt to be more controllable and human in scale. A third possibility is that the whole place may be in decline and that nobody may have the capital to invest in such frivolities.

KEYWORDS FOR INDEXING:

Education, university; Institutional links; Human scale

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Univ

Alb(1)(b)

INITIAL IMPACT ESTIMATE:

(b) At this depth of research and thought the impact of these changes on "university cities" can not be gauged. With a greater availability of resources, one would assume that the comparative advantage of such cities would be diminished. By the same token, the status of certain useful producers of high quality instruction (e.g. MIT?) might go up. Increased employment at such institutions is a possibility.

The real thing which is of interest is the possibility of any city becoming a university city with or without the physical presence of a school. Distance has been a factor in communications to date but if distance lessens as a factor (or even if it doesn't), the phenomena may be one of a university "serving" cities, towns, and firms further and further away until zones of influence begin to merge. This is just a possibility and would depend on the success of consulting by wire and on the cost of transportation. It is difficult to gauge the impact on the universities from this sort of change; do certain schools get some income only because others are too far away to economically provide places for schooling, graduates, or consulting assistance (the opposite hypothesis would be that the total capacity of the present system or even more will be necessary in the future, all other factors being equal).

INITIAL CATEGORY/OUTLINE

Univ

Alb(1)(b) (cont'd)

SCENARIO STATEMENT AND TASK:

Factors cited in earlier pages hold good for this impact as well.

TASK 42: Advise your local town to think about the possibilities of being a remote "university city." It will take a while to get used to the idea and to figure out how best to use. They might as well get a head start.

KEYWORDS FOR INDEXING:

Education, university; University cities

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Univ

Alb(1)(c)

INITIAL IMPACT ESTIMATE:

- (c) If such "matching systems" are developed for university use, they will have broader applications as well: various ways of taking advantage of the new media for linking people and resources. If successful in creative matching and responsive to individual needs at reasonable costs, such systems could lead to non-geographically based communities.

SCENARIO STATEMENT AND TASK:

Matching systems in general are ways, often computer-based, of informing people of resources that are available that might meet certain of their interests. To link a large number of educational institutions (and possibly other institutions as well) will require a large and sophisticated system that is responsive to individual needs and changing times.

If technically feasible, the development of such systems may be blocked for reasons of privacy, institutional conflict, changes of philosophy and values, or economics. They may be too complex to usefully control. No one may profit from their efficient upkeep.

TASK 43: If such systems are felt to be desirable, they will have to be paid for. This paying may give rise to new controlling institutions

INITIAL CATEGORY/OUTLINE

Univ

Alb(1)(c) (cont'd)

which in turn may or may not be felt to be desirable for a new set of reasons. These new institutions are worth postulating and evaluating in advance.

The purpose of this exercise is to examine impacts of the new technologies. What other uses and effects might matching systems have, outside the universities? Impacts must be relevant to settlements.

Information transfer within settlements might be altered by systems that deliver certain types of information to users: newspapers assembled to customfit the interests of users, for instance.

Since such systems are feasible now, their use has been proposed by the author to facilitate congresses, conferences, and conventions. In conjunction with new media, instant meetings with remote conferees become possible, as common, productive occurrences frequently involving people who have never met but who are listed as available for conference.

As their sophistication increases, such systems may be used increasingly for search purposes; incorporated with improving pattern recognition technology for instance, matching systems could be used to search large numbers of optical signals coming from streetside cameras to search for wanted individuals; the cameras are now in use in some areas to help fight crime by giving a wider view of trouble areas to a central system of monitors. The system could be cued to call for human intervention when people are talking, perhaps in combination with microphones

INITIAL CATEGORY/OUTLINE

Univ

Alb(1)(c) (cont'd)

cued to certain words. It doesn't seem to be a very foolproof system. As we vary the government, levels of societal schism, and general background, the above technology begins to look very undesirable to this author.

For the individual researcher anyway, there is not much of an opportunity to intervene. To the best of this author's knowledge, all of the alternatives above are now technically possible; the problem of control is not purely technical. TASK 44: How can one legislate against undesirable applications of this technology.

KEYWORDS FOR INDEXING:

Matching systems; Education, university; Conferences, conventions, conclaves; Crime; Privacy; Big Brother

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Univ

Alb(2)

INITIAL IMPACT ESTIMATE:

- (2) Schools whose "live" resources are unique will prove of varying advantage to their home communities, depending on the type of students and faculty drawn and the affects of this new type of education (if it occurs) on feelings of responsibility for community involvement.

SCENARIO STATEMENT AND TASK:

Depending on development patterns, this usefulness will of course vary. If some present feelings hold, it seems that the unique resources in part will be devoted to the home geographic community or to some other service area; "hands on" education seems to be gaining at this moment and for the time being geography will probably limit student and faculty involvement for the most part to nearby locations. Depending on the way in which things are begun and continued, this could work out well or ill for the towns involved. Conflict seems built into the situation. TASK 45: For clues as to possibilities in this direction , examine present patterns of involvement, particularly for smaller schools with no big reputation and look particularly at recent trends. Where larger-scale involvement has been tried, what has been the range of results? In what areas was the relationship initiated? What was the nature of the proposed relationship: client/consultant; citizen/government; savior/savee?

INITIAL CATEGORY/OUTLINE

Univ

Alb(2) (cont'd)

As in many of the points explored to this point, the question has a large normative component. What sorts of partnerships might work, given varying amounts of institutional resources that might be devoted to the task? Revenue sharing and issues of municipal finance are external variables to be watched.

KEYWORDS FOR INDEXING:

Unique resources; University cities; Education, university;
"Hands on" education

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Univ

Alb(3)

INITIAL IMPACT ESTIMATE:

- (3) If these innovations or other factors (are not enough to prevent)(cause) large numbers of schools to close their doors, it seems likely that massive community and national impacts will occur because of the shutdowns.

SCENARIO STATEMENT AND TASK:

The converse is also possible. If wide varieties of higher education become acceptable (at least partly because of the new technologies*, this may cause large numbers (or small numbers) of schools to shut down. The faculty members won't die but will have to seek new occupations which may or may not be concerned with education. Some type of research institution may evolve (or at least be called for) although it seems likely that the more the research is regarded as "useful", the less likely the school to fail.

The educational impact may be more serious and is certainly more difficult to gauge. Will the new institutions (nature unspecified) take over all the functions of the defunct schools or just enough to send the schools under for want of a few more students? If so, what will be the value of the no-longer-offered services/advantages? We tread quite softly here. TASK 46: What sort of feelers ought to be extended in this area, not just to check on the health of the institutions but

* See A3, page 146

INITIAL CATEGORY/OUTLINE

Univ

Alb(3) (cont'd)

on the nature and value of those that fold and the nature, value and
impact of the institutions that seem to replace them?

KEYWORDS FOR INDEXING:

Education, university. economics of

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Univ

Alb(3)(a)

INITIAL IMPACT ESTIMATE:

- (a) If large numbers of schools fail, the physical and functional diffusion of the faculty and students may impact economic patterns and educational ones in ways most indirectly related to communications technologies.

SCENARIO STATEMENT AND TASK:

Settlements will be at an advantage if they are psychologically prepared to take efficient advantage of this potential, deciding first what they need and then looking over the crop and paying for what they want. This sort of "preparation" is not something that is done specifically for this purposes; no Task recommendations.

KEYWORDS FOR INDEXING:

Manpower; Education, university

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Univ

Alb(4)

INITIAL IMPACT ESTIMATE:

(4) A danger of "unique" schools is an overemphasis on disciplines in their narrowest sense. In the view of this author, the result of such a trend would be an educational system inadequately fulfilling its responsibilities to society and to its students.

SCENARIO STATEMENT AND TASK:

TASK 47: I would reemphasize the need for indicators to signal the beginnings of change in educational programs and products. Some such inventories are performed by the Federal Government now on public school programs. Vast improvements are necessary.

KEYWORDS FOR INDEXING:

Education, university; Indicators

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Univ

A2

INITIAL IMPACT ESTIMATE:

2. The quality of lectures, particularly in slowly changing subjects, may go up and result in a small increase in the quality of education, whatever that means. The reason: greater use of high quality lecturers and lectures. The analogy to phonograph records and music is a close one.

SCENARIO STATEMENT AND TASK:

Not all the phonograph records produced are good ones. Similarly, it seems a reasonable counterassumption that the quality of the average class will remain stable due to the vast numbers of taped and live lectures available, all qualities, all prices.

The impact on curricula is similarly uncertain.

KEYWORDS FOR INDEXING:

Education, university; Lectures; Quality of education

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Univ

A3

INITIAL IMPACT ESTIMATE:

3. The lectures could be sold to other, non-college institutions such as adult education, prisons, private schools, television stations, etc. Such diffusion might blur the lines between previously distinct types of education.

SCENARIO STATEMENT AND TASK:

Some such diffusion already occurs but in quite small, controlled fashion; high school curricula are developed in colleges, for instance. College outline books are used elsewhere as are college level texts. What is now being cited as a possibility is information transfer at much higher volume levels.

Higher transfer rates may enable more unique types of educational products to be transferred by unique types of institutions. It seems more likely to lead to institutions that look more alike and are more interchangeable. This may be only a temporary phase and prelude to institutional reformation.

It might be expected that this kind of diffusion would influence the average level of education in the country. What impacts that might have will depend on the type of education each receives.

In time of political or economic instability, such change-in-progress

INITIAL CATEGORY/OUTLINE

Univ

A3 (cont'd)

may render educational institutions and processes more vulnerable to disruption and damage. Insecurity is liable to be high, involvement in institutional processes low.

KEYWORDS FOR INDEXING:

Societal conflict; Education, institutional diffusion and change;
Education, university

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Univ

A3a

INITIAL IMPACT ESTIMATE:

- a. Problems in certification of new educational institutions might arise, impacting either the institutions (and students), the certification process, neither, or both. These temporary problems might cause difficulties for communities in which the lead had been taken in this change process. On the other hand, benefits of a broader, richer educational system might ultimately compensate, particularly if the area had a comparative advantage.

SCENARIO STATEMENT AND TASK:

One unfortunate impact that might occur here is likely if at the time this transformation is in its early stages, other trends are running against formal or purposeful education. Excess hassle in receiving certification, new institutions not surviving childhood, towns bitter over value not received might all contribute toward a shift away from all kinds of institutionalized education. Such a trend would probably run across broad segments of society and embrace many kinds of institutions. It would likely be extremely turbulent because of the contradictions implied if people really meant it. This country is based on institutions even more than it is based on environmental exploitation. Real movements against either mean turbulence. TASK 48: One of the values of looking ahead is getting used to the unusual. A study of other societies that

INITIAL CATEGORY/OUTLINE

Univ

A3a (cont'd)

revolted against their institutions or established practices might make interesting reading.

Such a movement, based on any number of plausible themes, might be either reinforced by or crusade against drugs and drug-like uses of the new communications technologies (see section on Dreamies, page 198.

KEYWORDS FOR INDEXING:

Education, certification; University city; Movement against institutions; Dreamies

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Univ

B

INITIAL IMPACT ESTIMATE:

- B. Universities and colleges might be more likely to set up
branch campuses with most lectures piped in.

SCENARIO STATEMENT AND TASK:

When the author was a youth, I attended a newly founded
branch church. There was a congregation, physical plant (rented), officers,
fund-raising machinery, and esprit; the sermons were piped in live from
the founding church some twenty miles away.

This would just be another example of the sort of diffusion
discussed earlier. Using high capacity video and audio channels,
perhaps coupled with facsimile devices and later direct access to electronic
library systems, it becomes more feasible to set up small campuses in
out-of-the-way areas particularly where students may not have the
resources or the time to travel to the main campus; classes may be in
an institution of some other sort, for instance. This may cause a
few changes in the home institution; it has been suggested by research
results that such a hookup might be most educationally effective if
the professor conversed with all his classes by two-way remote, even
if he were next door to one of them.* Remote students evidently
don't learn as well, even with a two-way hookup if the professor is
physically with another section.

*
Sorry, no footnote.

INITIAL CATEGORY/OUTLINE

Univ

B (cont'd)

Communities that have never had an educational institution might begin to reap some of the advantages of varying types of education. With smaller investment in given courses of study, such institutions might be more flexible and/or more faddish. In some ways, they might be of more advantage to a community than a traditional school.

KEYWORDS FOR INDEXING:

Education, university; Education, diffusion; Branch campuses;
University cities; Church

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Univ

B1

INITIAL IMPACT ESTIMATE:

1. Some campuses established a bit later might contract for services. In other words, either colleges A and B would jointly set up a remote subcampus and pipe in lectures and set up discussions, or the new campus would be independently planned and search for host institutions or for individual subjects.

SCENARIO STATEMENT AND TASK:

By beginning in advance of others, reserving any necessary cable franchise rights, and building a careful base of financing, communities may be able to do a lot of good for themselves; instead of waiting for some educational institution to pick them and set goals and programs, they will have a much greater potential for taking the initiative. A mixed public/private organization may well be the optimum.

Such new structures if viable may give communities new options for self control. These in turn will have powerful impacts, some intended, some not. A place may try to encourage a certain type of work force, may become engaged in an educational technology race with its neighbors, may create a new feeling of self-identity, may retain a greater portion of its younger people, may encourage economic growth, may find itself with an unwanted quota of protesters and buttinskies, may begin to undergo change as technology transfer to local processes is speeded. High

INITIAL CATEGORY/OUTLINE

Univ

B1 (cont'd)

information flow rates, geographic proximity, and new kinds of people will likely be powerful forces for change and new conflict. TASK 49: Study the viability and formats possible for this new kind of institution. Institutional assessment, a vital and largely unrecognized art recently pioneered by Dr. Frank P. Davidson of MIT, may be applied here to great advantage. Think of a name for the new beast. With its possible midwife being a town or small city, new governing formats may be desirable.

The scenarios bring out the many possibilities for change. The new educational institutions may be more flexible in their subject matter as noted above (see page 28). They will be at least as vulnerable as present universities to student learning and student disruption (a factor that may cause some educational investment dollars to flow to correspondence schools and in-the-home media programs). The form of the new institutions will be affected by the economic situation and the intentions of the founders (will they see the institutions as direct or indirect money-makers, as stimulants for social action). Normative questions include physical format, relationship to other societal institutions, particularly the governments and other educational institutions, and the precise role of faculty, the student/faculty/administrator (fundamental changes in the traditional role definitions seem plausible given entirely new types of institutions but seem unlikely given a probable striving for respectability and certification).

INITIAL CATEGORY/OUTLINE

Univ

B1 (cont'd)

KEYWORDS FOR INDEXING:

Education, university, innovative forms; New schools by wire;

Institutional assessment

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

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Univ

C

INITIAL IMPACT ESTIMATE:

- C. Combining with other trends, the ability to tape lectures and disseminate them cheaply plus new matching systems for contacting people of similar interests may lead to the growth of college-level programs in non-collegiate settings.

SCENARIO STATEMENT AND TASK:

As noted earlier in these sections on education, these trends may be inhibited or totally stopped by economics, value change, or the quality of education produced. The economics of the system of producing remote educational resources (live, books, computer, or taped) may not be sufficiently profitable to attract capital in some economic situations; in fact, the system may start, succeed and then fold due to external conditions (capital sources, changes in disposable income, end of tax supports, dwindling of physical resources causing unacceptable increases in factor prices, lack of interest in the product).

The trend (as implied earlier) may also be toward a reformation of educational structures and categories, facilitated by the new technologies. (See e.g. 129, 142, 148, 150.)

KEYWORDS FOR INDEXING:

Education, innovative forms; Education, diffusion

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Univ

C1

INITIAL IMPACT ESTIMATE:

1. The colleges are protected, isolated settings in many ways. Educations intimately set into the "real world" may eventually result in new ideals for education that place more emphasis on immediate function and utility, less on the classics, spending four years finding yourself, learning for the sake of learning, and learning how to learn.

SCENARIO STATEMENT AND TASK:

This is not to say that, even in these circumstances, the old ideals would necessarily vanish, just that the number of people exposed to them would diminish. In the competition for students, even the traditional institutions may be influenced to play them down.

The synthesis may go the other way, resulting in new formats but many of the same ideals.

These musings are somewhat removed from relevance to the urban core and the agrarian myth. No apologies. The vistas are clouded. Will we see working-learning communities of adolescents and post-adolescents dedicated both to production and to learning? It does not seem out of the question if the older institutions begin to lose their vitality in the competitive heat.

INITIAL CATEGORY/OUTLINE

Univ

C1 (cont'd)

KEYWORDS FOR INDEXING:

Education, innovative forms; Working-learning communities

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Univ

C2

INITIAL IMPACT ESTIMATE:

2. College level programs in new institutional settings in a context of increased leisure time seem likely to produce a real potential for lifestyle change at several age levels. Other factors may completely change things around, but we are now concerned with possibilities and human communities. Advice to planners of all lands: hang loose.

SCENARIO STATEMENT AND TASK:

The changes in lifestyle may be large depending on other factors. The general trend facilitated here could be a change in family structure. As mentioned on the previous page, the new pattern may be educationally based with children leaving their first home to enter a second based on education, work or both. Depending on the timing, the second "family" may succeed the first or overlay it with the interactions going on simultaneously with each.

It is both difficult and relatively unnecessary to imagine detail. The freedom will probably be there to do such things more easily than they could be done now.

TASK 50: If there is anyone that might wish to concern himself with this particular change potential, it would be an architect. How

might buildings reflect the new patterns and flexibility possible;
better yet, how might the buildings change the lives within.

KEYWORDS FOR INDEXING:

Architecture; Lifestyles; Working-learning communities

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Name(s): SCE

Univ

C2a

INITIAL IMPACT ESTIMATE:

- a. Travel may become a much more common part of life, particularly during "educational phases", should such evolve. There may well be styles that come and go. Certainly international travel and stays would seem to be likely to increase. It won't seem as much like being long away from friends and relatives, for instance. People may well be better informed in the first place about other nations from the media and other factors; there is little reason to believe that travel from other nations to the States will not rise as much as travel away.

This sort of personal diffusion seems bound to have impacts on communities and may result eventually in blurring of international boundaries as stays lengthen and travel volume increases.

Expense of travel could alter the impact considerably.

SCENARIO STATEMENT AND TASK:

TASK 51: Get hold of whatever non-proprietary forecasting has been done by the airlines. Look at their expectations for ticket prices and volumes and the reasons for same. See how or if the forecasts jibe with the conjectures in this section for increases in travel volume.

Some alternative travel patterns:

INITIAL CATEGORY/OUTLINE

Univ

C2a (cont'd)

- (1) Because of expense, only the well-to-do will travel extensively, although for them, it becomes a way of life. If, for other reasons, the income distribution in this country becomes more skewed, travel by one group while another watches could exacerbate tensions. In this sense and in other areas, the media can act as a positive feedback, making bad situations worse (from some points of view) by illustrating them.

KEYWORDS FOR INDEXING:

Education and travel; Travel; Class conflict; Culture

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Univ

C2a(2)

INITIAL IMPACT ESTIMATE:

(2) Travel becomes prevalent for all income groups. People travel just about everywhere, getting up-to-the-minute information about what is in season, uncrowded, being done by neighbors, not being done by neighbors, in.

(a) The subsequent reaction may be toward status use of communications only and minimum travel, particularly as fewer and fewer places are left isolated, unspoiled, uncrowded. This seems a possibility even at present population levels as long as more people are traveling more often.

SCENARIO STATEMENT AND TASK:

The result might be private compounds in congenial climates. Large easements, legal measures (plus whatever) might be taken to insure privacy while the inhabitants lived, worked, traveled, and died while seldom leaving home. TASK 52: Granting the undesirability of such a situation and granting an assumption that it will definitely occur, what might be done, either here and now, or later?

The options are actually of two types: 1) accept the situation and ask how the benefits we might want (the value of unexpected, commitment to the physical, free exchange, feeling for the land, sloppily integrated

INITIAL CATEGORY/OUTLINE

Univ

C2a(2) (cont'd)

culture, broad exchange) might be guaranteed even in a "withdrawn" society and 2) ask how we prevent the whole situation from occurring?

Rather massive projects or movements seem implied, particularly by the latter option. Such can probably only be impelled by imminent threat causing effective counteraction before people get used to the idea of such communities.

TASK 53: Devise a set of indicators capable of registering changing trends in travel and mobility.

TASK 54: Imagineer several brands of physically withdrawn communities and analyze. Compare with various present varieties.

TASK 55: If the withdrawn communities are part of a likely future and if (as they seem to me) they are undesirable, then the best present project is to see what can be done to improve life as she is and make it more worth living. Withdrawal to a controlled environment sounds mighty tempting at times and there is no denying the advantages.

- (3) Travel may increase over the period with corresponding cultural benefits and some contribution to global integraion. Problems of national boundaries, conflicts, and costs hold back travel growth for a time but in the closing decade of the century, travel begins to decline as the home geographic location takes on new significance and self-exploration comes to the fore.
- The project recommendations made immediately above still stand;

INITIAL CATEGORY/OUTLINE

Univ

2a(2) (cont'd)

withdrawn communities are a possibility and that is what counts. (See Dreamies, page 198). No additional recommendations.

KEYWORDS FOR INDEXING:

Indicators; Withdrawn communities; Travel; Education; Cross-cultural contact; Self-exploration

ON LOOKING UP BY CHANCE AT THE CONSTELLATIONS

You'll wait a long, long time for anything much
To happen in heaven beyond the floats of cloud
And the Northern Lights that run like tingling nerves.
The sun and moon get crossed, but they never touch,
Nor strike out fire from each other, nor crash out loud.
The planets seem to interfere in their curves,
But nothing ever happens, no harm is done.
We may as well go patiently on with our life.
And look elsewhere than to stars and moon and sun
For the shocks and changes we need to keep us sane.
It is true the longest drought will end in rain,
The longest peace in China will end in strife.
Still it wouldn't reward the watcher to stay awake
In hopes of seeing the calm of heaven break
On his particular time and personal sight.
That calm seems certainly safe to last tonight.

Robert Frost

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Prod

A

INITIAL IMPACT ESTIMATE:

A. If the new technologies lead to substantial increases in productivity or if they lead to changes in work patterns, number of employees required for activities based in certain localities (e.g. cities) is likely to be substantially affected.

1. Unions in the area (geographic, industry or profession) are likely to object or to be formed, then object.

2. If the problem is severe, there may be a reaction toward new cri criteria for job definition so that more people can have a job that for them is useful, interesting.

3. Severe economic and psychological problems could result.

It is not clear to this author whether this question is susceptible to analysis in advance; there may be just too many variables. It may be well to assume that there will be serious problems and start to work from there figuring out how to detect their beginnings if they occur and what to do now and then.

SCENARIO STATEMENT AND TASK:

Scenario One: In the eighties of this scenario, there will probably be pressure to increase productivity and programs to encourage adoption of new technologies; in combination with the people-directed feelings

INITIAL CATEGORY/OUTLINE

Prod

A (cont'd)

that seem so important in this decade, the forces seem right for the type of reaction touched upon in "2." above: some new ideas on what a good job is, perhaps some redefinition of jobs based on new criteria.

The evolution of labor organizations and practices during the seventies and eighties will have an important effect. TASK 56: Investigate present level or research, thinking on new labor organization forms.

TASK 57: Investigate thinking on new criteria for job definition; I would hypothesize without having yet looked at the literature that such thinking may be on the upswing. Automation commissions and union think tanks would seem to be fertile ground for such research. TASK 58: Many other trends feed into this area; the threads need to be tied together.

Indicators for the changing character of temporary and structural unemployment need to be found and impact studies made that detail the full range of impacts of new technologies. Some serious thinking needs doing on the role of work. By what criteria should individual jobs be defined? How are those criteria presently changing (a language for characterizing the definition needs to be worked out and data collected; what impacts have such definition changes had? How is the average length of time on a single job changing for different types of jobs and what are the trends in this area?) These, as usual, are preliminary thoughts. The justification for the research is to produce some knowledge or ways of looking at things that will help private and public sectors see how the character of work is changing and how given

INITIAL CATEGORY/OUTLINE

Prod

A (cont'd)

changes in the character of work will affect things cared about (e.g. wages, profits, growth).

Going into the nineties with the question of an anti-technology movement open, we can see how adaptation in the eighties might be important. This country's feelings about high technology will be heavily influenced by how we have dealt with questions of technological unemployment or job disruption, should they arise. No recommendations for projects directly concerning needs generated in this decade.

Scenario Two: In the eighties it will be difficult to deal with problems that may be generated in the work area by new technologies; competing, conflicting power centers are likely to create a zero-sum game mentality and are unlikely to agree on new solutions. This author has problems visualizing how this particular trend line might interact with the postulated future. The resolution to the conflict might come from the bottom up and succeed if the power centers each see the new, common paradigms as strongly in their own interests. It seems more likely in these conditions that severe problems will result, perhaps forcing a temporary compromise involving some increase in unemployment, some increase in makework, some drop in realized productivity. TASK 59: Study past situations in other countries; are there parallels? TASK 60: Basically same as Task 58. Put more emphasis on new paradigms that might realistically be implemented soon. More emphasis on indicators of coming conflict.

INITIAL CATEGORY/OUTLINE

Prod

A (cont'd)

SYNTHESIS: Project should strongly emphasize detection of changes in the character of unemployment and employment and any conflict possibly traceable to these changes. Project should encourage "action tank" thinking about new paradigms. We may need new patterns sooner than we think.

MUSÉE DES BEAUX ARTS

About suffering they were never wrong,
The Old Masters: how well they understood
Its human position; how it takes place
While someone else is eating or opening a window or just
walking dully along;
How, when the aged are reverently, passionately waiting
For the miraculous birth, there always must be
Children who did not specially want it to happen, skating
On a pond at the edge of the wood:
They never forgot
That even the dreadful martyrdom must run its course
Anyhow in a corner, some untidy spot
Where the dogs go on with their doggy life and the torturer's
horse
Scratches its innocent behind on a tree.

In Brueghel's *Icarus*, for instance: how everything turns away
Quite leisurely from the disaster; the ploughman may
Have heard the splash, the forsaken cry,
But for him it was not an important failure; the sun shone
As it had to on the white legs disappearing into the green
Water: and the expensive delicate ship that must have seen
Something amazing, a boy falling out of the sky,
Had somewhere to get to and sailed calmly on.

W. H. Auden

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Comm

A

INITIAL IMPACT ESTIMATE:

Locally-originated programming can include programming centering on local elections, both "public service" and candidate-prepared types of programs.

SCENARIO STATEMENT AND TASK:

This author has doubts as to the ultimate effectiveness of such programs; the number of viewers seems likely to be low for most races under present circumstances.

What else might occur that might impact communities? Questions of slander and libel are, I think, already dealt with legally; the question of access is thorny enough to be dealt with elsewhere. TASK 61: Deal with political problems of access to CATV channels. Pay attention to possible use of electoral time for purposes of libel, slander, distortion, issues of large numbers of "fake" candidates running to overwhelm an opposition candidate with either similar positions or attacks. See Task 10, page 62.

Development of this type of programming in conjunction with possible trends toward greater mass involvement in politics (more leisure time) might lead toward greater feelings of potency and involvement in the processes of communities.

INITIAL CATEGORY/OUTLINE

Comm

A (cont'd)

The media may involve older, less mobile people to a greater extent than before. With available time, the possibility of great interconnection with others (depending on cost factors and social attitudes) and an increased view of the process, the older generation could gain increased political power.

In times of high conflict, the media could become more of a political battleground, particularly if stations become more partisan, as newspapers were when they were more numerous. TASK 62: Discuss how active cable stations might legitimately be in politics. There seems nothing wrong with partisanship as long as there is free entry and adequate protection of the rights of the public. Precedent is other way because of the limited access to existing communications channels. How ought things be different with the new media? Partisanship might also make the programming more interesting in some ways.

KEYWORDS FOR INDEXING:

Social conflict; Electoral politics; Communities; CATV; Elderly;
Older generation

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Comm

B

INITIAL IMPACT ESTIMATE:

B. CATV with two-way capability will be able to carry programming for instant polls, processing results almost instantaneously. As the cable system spreads, so will polling capability. The more cable networks are interconnected, the easier it will be to make large-scale polls or hold "remote" meetings with people participating by video.

SCENARIO STATEMENT AND TASK:

Of course, the cable systems may never get interconnected in a big way. Even so, the above remain possible.

KEYWORDS FOR INDEXING:

CATV; Polls; Meetings; Conferences

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Comm

B1

INITIAL IMPACT ESTIMATE:

1. Many people have thought of the system's utility and impact for governance. A good normative article by Etzioni and others describes a possible system, its drawbacks and what might be done about them.* One might cite dangers of demagoguery, misinformation, instant decisions, lack of access to theoretically completely open electronic meetings, lack of interest in same. The topic(s) are clearly of great importance, the more so because it would seem that no conscious policy decision is needed to bring us to electronic democracy. If there are dangers, we must look ahead and prepare or they will be on us. Enough rhetoric.

SCENARIO STATEMENT AND TASK:

TASK 63: Do literature search to determine state of the discussion. Consult to determine whether the opinion expressed above about the need for present action seems correct.

TASK 64: Based on the results of the task above, decide on next action. Will probably want at least to set up a commission to make legislative and other recommendations as a first step. Speed seems a factor.

* Etzioni, Amitai et al., "MINERVA: A Participatory Technology System", Bulletin of the Atomic Scientists (November 1971), pp. 4 - 12.

INITIAL CATEGORY/OUTLINE

Comm

B1 (cont'd)

There are intangibles and it is tough to see how to get a handle on them. For instance, when evaluating the possible impacts of "electronic democracy", how does one rate potential frustration? With two hundred million people in the act (an exaggeration), how will one feel-- will the emotion be one of increased potency because the act allows one to talk and vote as part of a process more frequently-- or more impotent because of an increased number of opinions and confrontations? Perhaps this side should be ignored. It is difficult to imagine trying to ban such systems because of their "frustrating impacts on the masses".

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Comm

B2

INITIAL IMPACT ESTIMATE:

2. The new communications may hit town in some quite unexpected ways. This author is presently a strong believer in their potency in facilitating conferences, congresses, and conventions.

TASK 65: Examine the economic role that conventions play in cities. If conventions split into smaller pieces, geographically, smaller sessions being held in either small exotic places or closer to homes with sessions being shared electronically, what might be the impact on "big" convention cities?

TASK 66: Hire on as a consultant for an innovative society and see what can be done to make their next congress, conference, or convention what it might be.

SCENARIO STATEMENT AND TASK:

Auden said that the words of a dead man are modified in the guts of the living. What comments might be made on actual impacts of such uses?

This is just another form of remote meeting like that discussed on the previous page. The possibility of quicker interaction with more people seems imply faster response to stimuli; perhaps an increased pace of change; greater pressure; greater input to decisions from the number of sources that can be quickly consulted (this seems to me highly

INITIAL CATEGORY/OUTLINE

Comm

B2 (cont'd)

unlikely); quicker formation of political power blocs for specific purposes (the splitting influence of many small cable systems may work against that trend). To this author, the potential influence of this particular use in these ways is marginal and deserves no additional action. The use has been examined in the context of each scenario.

The last question raised in this section is the pace of change itself. Whether or not preparation for action is warranted now, is there a priority for working out some useful indicators or statistics which, in some circumstances, might indicate a need for action. The answer here lies in what people want and in, perhaps, the mental health statistics.

TASK 67: I would advise polling organizations (with development work funded by foundations perhaps) to begin a regular series of polls to try to keep tabs on what people feel about change itself. If after a period of polling, the answers seem to make some limited kind of sense, then individuals can proceed to draw their own conclusions.

KEYWORDS FOR INDEXING:

Indicators; Conferences, conventions, congresses; Change, pace of;
Remote meetings; Political blocs; Pressure, psychological; Entrepreneurial opportunities

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Comm

C

INITIAL IMPACT ESTIMATE:

- C. More extensive programming for learning English, broadcast in many "base" languages.

SCENARIO STATEMENT AND TASK:

Television and radio are evidently already potent forces in this area. "Narrowcasting", programs for limited audiences, should make available language lessons for many other basic tongues.

This is another impact toward a more unified culture on many levels. Care will have to be taken to avoid biasing the lessons just as standardized tests now must avoid favoring one culture or another.

Unless considerable care is taken, the net impact of this and other programs may be to speed the rate of the melting pot; the media could be a force for diversity if space is reserved for "cultural" programming, if people choose to use it to establish new pieces of "cultures", and so on. TASK 68: Think this issue through. It is most complex, not necessarily susceptible to any kind of prediction, but worth the work. What measures are presently necessary to encourage diversity? Questions that ought to be answered include the nature of the control of the new media, particularly the large new networks. Spectrum engineering will produce new channels and a capacity for more new media as detailed in Appendix II; there is

INITIAL CATEGORY/OUTLINE

Comm

C (cont'd)

more future coming. Who will control and how might the capacity be used?

KEYWORDS FOR INDEXING:

Language lessons; Community control of media; Control of media;
Melting pot; Diversity; Homogenization; Spectrum engineering

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Comm

D

INITIAL IMPACT ESTIMATE:

- D. Religious music, even sermons could be used in "storefront" chapels or in remote areas as backdrops for more personal or local effort.

KEYWORDS FOR INDEXING:

CATV: Church

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Comm

E

INITIAL IMPACT ESTIMATE:

E. The new media can function as real time want ads, displaying job openings. When linked to a computer, the same data can be used on an individual or small group basis so that only jobs of potential interest will be displayed, either by television or other media.

SCENARIO STATEMENT AND TASK:

No obvious impacts beyond those intended. Can you think of any? Let me know. TASK 69: Who will perform this service? Who will pay for it? What possible answers are there for those questions and who is working on answers, if anyone? Moderate priority.

KEYWORDS FOR INDEXING:

CATV; Employment; Community use of CATV

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Comm

F

INITIAL IMPACT ESTIMATE:

F. Cheap communications may enable pollution- and congestion-choked cities to come down harder on intracity use of automobiles. The same effect may be caused by individuals deciding in similar circumstances not to come to town or at least by various schemes to avoid driving in the core. Car pools and more transit with nodes near the city might evolve. Computer controlled buses (Dial-a-Bus) might come into wide use as distribution devices. Personal Rapid Transit (PRT) or dual mode (individual vehicles which can also be entrained on guideways) may also replace the car in the cities.

SCENARIO STATEMENT AND TASK:

The car may diminish in importance in the urban cores or other areas of presently high concentration because of the adoption of new transportation technologies that are of sufficient utility and attractiveness.

Anti-pollution technology and quieter engines may make the car less objectionable to the point where no direct measures are taken against it in most areas. Congestion will presumably still be a problem and will cause some substitution of new media for trips.

Other alternatives are also possible. TASK 70: What recommendations

INITIAL CATEGORY/OUTLINE

Comm

F (cont'd)

ought to be made to city governments so that they might better analyze their own situations and futures in this area? TASK 71: Which alternatives require larger than single city action and who are the decision-makers or sets of decision-makers with power to implement each? On what level should optimization studies be made that are likely to produce satisfactory, implementable plans? It seems to this author that for the next decade or two transportation and communications planning will be able to be done effectively in separate processes; after that, transportation and communication planning may have to be a single process. Comments?

It seems a priority to do this kind of work immediately. As the scenarios point out, you will never know until it is too late that there was no time like the present.

KEYWORDS FOR INDEXING:

Transportation planning; Urban pollution; Pollution; Congestion

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Comm

F1

INITIAL IMPACT ESTIMATE:

1. The movement systems in cities may by degrees become more dedicated to pedestrians, goods movement, transit and taxis, not to mention bicycles.
 - a. It is possible that such evolving use patterns could be a force toward the reversal of some aspects of urban sprawl. If intracity mobility is reduced, then the fabric of the city may draw toward transportation nodes and, perhaps further into the sky and ground. Just a chance.
 - b. The hopes of the late nineteenth and early twentieth century for the exit of the horse, a clean city, and the hossanahs that went up at the prospect of the automobile seem pathetic in the present smog.* One might cautiously hope yet that such a change might be a small step toward a pleasanter, cleaner, quieter urban environment. Maybe healthier, too.

SCENARIO STATEMENT AND TASK:

TASK 72: Examine the extent to which physical planning of land use has been operationally linked to transportation planning in cities. What is the state of the art in predicting how transportation patterns will impact land use?

* J. Flink, op. cit., p. 105.

INITIAL CATEGORY/OUTLINE

Comm

F1 (cont'd)

KEYWORDS FOR INDEXING:

City planning; Urban sprawl; Pedestrians; Goods movement; Transportation
planning

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Comm

F2

INITIAL IMPACT ESTIMATE:

2. Parking garages could be turned to other uses, or at least their land might.

SCENARIO STATEMENT AND TASK:

TASK 73: Buy leases and options.

KEYWORDS FOR INDEXING:

Transportation; Parking garages; Entrepreneurial opportunities

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Comm

F3

INITIAL IMPACT ESTIMATE:

3. More people may transact business from their homes (or other bases) and not come to town at all. The new communications technologies would reinforce the trend by making it easier to stay at home and get services and easier to get businesses away from the traditional services of urban concentrations. In the next five to ten years, it should be possible to access and even program a computer using just a touch tone phone. Business services will be more practicably rendered at a distance than they can be at present. With effective picturephones or better visuals, it would seem quite possible that satisfactory personal contact could be made, particularly if other factors were already pushing in that direction. If the credit system becomes more automated, it will also facilitate the move.

If privacy can not be guaranteed, then the movement outward might be slowed. It would seem likely then that many interests in society would have reasons to press for adequate safeguards-- if they are technically possible.

SCENARIO STATEMENT AND TASK:

TASK 74: Study the business service structure more carefully, including its requirements for personal contact and for goods movement to patrons in various types of business. If good quality, moderate to

INITIAL CATEGORY/OUTLINE

Comm

F3 (cont'd)

high resolution, two way video were available, what percentage of total business could feasibly be done with customers who could use the other end of the transmission line (either in a home or in a public transceiver)? What economies might be achieved and additional costs created if half of this figure were actually done remotely: in transportation, in physical plant, in advertising, in work force.

This does not cover the problem of course. Much work is done remotely now using telephones, the mails, data transmission. Still it is a start at getting a handle on the problem. This development is predicted by Martin for the late eighties (see page 339). Pressure for this type of trend might be increased if, as in Scenario Two, population begins to increase, particularly in the older less mobile parts of the population. The role of child-rearing in the family will also have an influence. No other action recommendations.

KEYWORDS FOR INDEXING:

Business at home; Business services.

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Comm

F3a

INITIAL IMPACT ESTIMATE:

- a. The net effect could possibly be toward smaller conurbations.

SCENARIO STATEMENT AND TASK:

TASK 75: Survey the literature on ideal city sizes; much of it published in England. Which factors have been identified as important in determining optima? Is there any evidence that these factors have any bearing on the actual sizes of cities? If so, which might be altered by the new technologies? It is possible, for instance, that the controlling factors (if there are any) or the factors that lead to large cities may not be relevant to the applications of the technologies. Usefulness of the task: in normative politico-functional studies, maybe. This one seems of lesser priority.

KEYWORDS FOR INDEXING:

Cities, size

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Comm

F3b

INITIAL IMPACT ESTIMATE:

b. If people can get culture and salaries while at home, movement away from primary urban cores may accelerate if amenities there decline. Whether those who leave travel to uniform suburbs or to smaller towns or concentrations, the population of the primary cities would decline at least until the quality of life rises for the inhabitants. However, as a tax base erodes and a physical plant becomes more unused and deteriorated, livability seems destined to decline at least in the medium term.

(1) Crime will probably continue to increase in such circumstances, powering the decline still further. Production and distribution functions may be seriously disrupted, particularly if there is a strong political component to the violence.

- (a) Increased crime will bring increased pressure for electronic surveillance of streets for increased protection.
- (b) A crackdown will probably elicit further trouble.
- (c) Production functions too may be moved outside the core if the disruption becomes serious. The counter-pressure here is ecological; where to put dirty industries. The rest of the country may be pressed to make it worthwhile for industry to stay in the city core in such circumstances, certainly an apocalyptic sort of vision.

INITIAL CATEGORY/OUTLINE

Comm

F3b (cont'd)

SCENARIO STATEMENT AND TASK:

This is certainly not an exact picture of the future; it may not even be in the cards at all. Given that there is a chance that events such as these may be on the way, is there anything we ought to be doing now?

No simple recommendations that I might set down here could possible answer that question. Necessary indicators, the census metropolitan financial statistics, and figures on the crime rate are available now, for the most part. Usefully aggregated, non-dimensionalized forms may not be but that is a detail. What questions ought to be asked and by whom?

TASK 76: Policy discussions ought to include the question of how large cities might effectively deal with decreases in population and tax base while maintaining standard of life. A diversified national policy is probably superior to a national, every-where-the-same attitude toward possible massive urban decline. Nonlocal funding of programs ought to be to nonlocal organizations i.e. Federal funding and state funding of regional, state and, at the smallest level, large definitions of metropolitan areas. What other questions ought to be asked, do you think, and where should initiatives begin?

INITIAL CATEGORY/OUTLINE

Comm

F3b (cont'd)

KEYWORDS FOR INDEXING:

Urban decline; Population; Crime; Violence; Suburbanization; Home-
based business

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Comm

F3b(2)

INITIAL IMPACT ESTIMATE:

(2) In such circumstances, there may be an increasing unreality.

There seems at least a possibility that people outside the cities with a multiplicity of choose-it-yourself, tailored communications channels will fall out of touch with the realities where they are unpleasant, more than at present. In such circumstances, with declining political and financial power and without support from outside, reality may become more unpleasant for those living in or near declining areas.

SCENARIO STATEMENT AND TASK:

If political activism is increased by increased leisure time and communications access, the problem may possibly be exacerbated; groups may gain greater power to improve their own welfare and unless numbers see something to be gained from cities or unless the people in the cores have at least as much power, declining areas may be at more of a disadvantage than they might be today.

Things may be improved for the cities by increased centralization on the national level and economic prosperity; it is also possible that schisms, which are also postulated in the second scenario for the nineties, may make the government more likely to do nothing more than the minimum to support the cities. People at different places have different values

INITIAL CATEGORY/OUTLINE

Comm

F3b(2) (cont'd)

and constraints; so do people at different times. If we wish to advance our own image of societal optima, we must begin to act in the present.

TASK 77: Devise schema through which various groups or places would be guaranteed or given a good chance to get access to media in front of other groups or in other places, all without driving the country toward the same uniformity of coverage and programming which we presently enjoy.

KEYWORDS FOR INDEXING:

Unreality; Urban decline; Diversity; Access to the media, remote

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Comm

F3b(3)

INITIAL IMPACT ESTIMATE:

- (3) Who will live in the central city in such circumstances? It would seem to depend on enough factors as to make the answer indeterminate just now. It might be blacks and minorities too poor to move. It might be nobody if the price of moving out is low enough.

The possibility of a society increasingly dumping upon a minority of people still living in deteriorating cores is serious enough to merit quite a bit of attention. This may be a low probability future; it is also high risk.

SCENARIO STATEMENT AND TASK:

I suspect that the few answers that might go anywhere to giving an answer with some long term strength all involve fairly deep-rooted societal reform. TASK 78: Begin to outline the beginnings of reform processes; concentrate on the literature for ideas. Output of study: recommendations for larger action. What we are attempting to deal with in this area are large, ongoing societal systems. Many people perceive problems in this area and are trying in their own ways to do something. The author has nothing to add to that discussion at this time.

KEYWORDS FOR INDEXING:

Urban decline, who lives there

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Comm

G

INITIAL IMPACT ESTIMATE:

G. Because of point-to-point nature of the new technologies, the cities may lose some of their role as cultural centers

SCENARIO STATEMENT AND TASK:

This topic deserves a lot more time than this author can give it. The impact will vary according to the speed of adoption of such technologies as wall-sized TV screens and superhigh fidelity sound, but seems like a fair-sized possibility in any case. As the scenarios indicate, this trend will also be dependent on levels of urban violence, the state of the economy and the state of transportation.

TASK 79: Study ways and policies by which cultural resources might remain financially viable or even prosper (e.g. football). The problem of cities is likely to be the larger one of staying livable. Some resources such as fine restaurants will be a long time being supplanted by electronic media. On the other hand, if some resources move out of the city (freed by new revenue to move to more pleasant surroundings), restaurants and hotels, for instance, may follow.

The counterquestion is if industry and culture naturally move away, what good are large cities, or urban cores at least. TASK 80: Study other possible formats which satisfy likely future requirements for

INITIAL CATEGORY/OUTLINE

Comm

G (cont'd)

living space and jobs in this country and which, if encouraged or not discouraged, might evolve. I am prepared to assume till the conclusion of such a study that "cities are worth saving"; it is a job of such magnitude (or so it would appear) that we ought to know for what we are working.

KEYWORDS FOR INDEXING:

Culture; City alternatives

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Dreamies

INITIAL IMPACT ESTIMATE:

DREAMIES ARE A NAME GIVEN TO A COMMON SCIENCE FICTION CONCEPT, A KIND OF ELECTRONIC INJECTION OF THOUGHTS, DREAMS INTO THE BRAIN. IN THIS CATEGORY IS INCLUDED POSTULATED AUTO-HYPNOSIS THROUGH VISUAL PATTERNS DISPLAYED ON LARGE SCREENS AND MADE-TO-ORDER FANTASIES SHOWN IN YOUR OWN HOME. DREAMIES MIGHT BE THOUGHT OF AS SUCCESSORS TO MOVIES, AS PORNOGRAPHY, AS NARCOTIC. THE READER IS REFERRED TO THE SHORT STORY, "DREAMING IS A PRIVATE THING" BY ISAAC ASIMOV AND THE NOVELETTE, THE LION OF COMMARRE, BY ARTHUR C. CLARKE.

SCENARIO STATEMENT AND TASK:

The first thought is that, in varying circumstances, dreamies may never occur. Their advent, either as accepted entertainment or as outlaw does seem extremely likely. They probably will have a different name but hypnosis, alpha. feedback, large screen television, drugs and pornography all make dreamies seem extremely likely to this author.

KEYWORDS FOR INDEXING:

Dreamies

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Dreamies

A

INITIAL IMPACT ESTIMATE:

- A. Potent dreamies will repeat the dilemmas of pornography and drugs but emphasized. Some technological options may be quite addictive, psychologically, for instance. The line will be thin between art and the kind of damage to settlements that heroin addiction can cause.

SCENARIO STATEMENT AND TASK:

The impact of dreamies will be highly dependent on the societal context. It seems probable that stagnant times and hopeless times might make dreamies a much more damaging sort of innovation.

The policy reaction, too, will be heavily context-dependent. Will a dictatorship crack down on a technology that offers a way to freedom and withdrawal; it seems likely, just as likely as political dreamies, subtly slanted or more obviously, operating directly on the brain.

A number of issues have been raised in this thesis that seem infinitely easier to face if they never arise. Dreamies are such a one. The name sounds funny and in many contexts they may develop as art forms and meditation devices, abused occasionally, but only a minor problem for the body of society. Dreamies may even enable people paralyzed and, if conscious in pain, to enjoy the lives they would like to be leading, all within their minds, perhaps transmitted from central memory banks or

INITIAL CATEGORY/OUTLINE

Dreamies

A (cont'd)

custom-made. In a society providing challenge and reward, the issues arising from dreamies can be faced: complete and permanent withdrawal, for instance. In a society which, by its conditions, encourages their use and perversion, it is difficult to see how they can be dealt with. If such a prod would do any good, the threat of dreamies making bad situations much worse, just as heroin does now, should make anyone think quite seriously about the future possibilities for this society.

TASK 81: Deal with the possibility of dreamies before they become real.

KEYWORDS FOR INDEXING:

Dreamies; Psychological impacts; Heroin; Crime

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Aged

A

INITIAL IMPACT ESTIMATE:

THE NEW TECHNOLOGIES HAVE APPLICATIONS FOR THE AGED AND THE HANDICAPPED

A. By reducing the necessity of mobility, more elderly and handicapped individuals may find the ability to act and to interact further into life than presently. Families can be visited, services offered, "vacations" made, groceries ordered, businesses conducted, and help called for with little need for movement. This is not unalloyed benefit but in some cases, communications may take "withdrawn" people and give them another turn at bat.

SCENARIO STATEMENT AND TASK:

This author does claim to understand the mechanisms of society well enough to be able to predict what will happen when increasing leisure, labor costs, automation, population, pollution, international competition, resource depletion, and politics mesh. It does seem likely that the elderly will have an increasing say in how the cake is cut. Politics may become increasingly popular, for instance, for those fifty-five year old retirees and their growing constituencies.

The impact on settlements will therefore be indirect (if it occurs) and will be in the form of changes in the political power structure. The elderly seem likely to be a conservative force and powerful and will

INITIAL CATEGORY/OUTLINE

Aged

A (cont'd)

probably shuck the title "elderly" quickly. This author does not recommend any action or indicators; both scenarios have been examined. The forces brought to bear will differ in different circumstances; there is no evidence that the force this group may plausibly bring to bear will be so disproportionate to their numbers as to warrant action. In some circumstances they might not attain the influence they deserve; access must be guaranteed. TASK 82: Find out if people who can not travel to the television studio are guaranteed media access remotely if they live within a defined community.

KEYWORDS FOR INDEXING:

Aged; Mobility and access; CATV; Political power

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Aged

B

INITIAL IMPACT ESTIMATE:

- B. The new technologies have a potentially massive impact in store for the systems for caring for the elderly.

SCENARIO STATEMENT AND TASK:

Some alternatives, depending on costs and other variables:

1. More "homes" to take care of the elderly, equipped with special purpose high volume communications equipment, studios, etc.
2. "Communes" for the elderly to take care of themselves in groups.
3. Decreasing need for organized homes as more people can care for themselves (in many cases with the family's help) for longer periods into their lives. Such statements as these should make it clear that there are a lot of factors governing the course of events in this area, like for instance what will people be terming a "family" in two or three decades?
4. Possibility of growing personal isolation of individuals as families feel freer to ignore them since they are in clean, well-mechanized places.
5. Possibility of quicker moves to senility if new communications applied in mostly one-way modes: traditional TV, art, travelogues, dreamies (see page 198: modes that can encourage passivity).
6. Might there be a real collapse in care if a growing reliance

INITIAL CATEGORY/OUTLINE

Aged

B (cont'd)

is placed in mechanical aids and then economic depression makes them too expensive to replace or keep up, after large part of traditional work force has departed the scene. The judgment of this author is that this is going to be, at worst, a temporary effect. It seems more likely that any factors which result in a cutback in technology would encourage people to come back to work (barring suddenly-revealed electronic safety hazards proving irremediable).

TASK 83: Poke around a little an- see how much these opportunities and possibilities are realized, how able the present structures seem to take advantage of them or to fold without a great fuss. Then decide on further action.

KEYWORDS FOR INDEXING:

Aged, homes; Aged, communes; Health, delivery systems; Personal isolation; Passivity

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Health

A

INITIAL IMPACT ESTIMATE:

A. Majority of doctors may well have terminals for consultation purposes by the early '80's.*

1. This may further urban dispersion by making a service accessible at a distance.

SCENARIO STATEMENT AND TASK:

Although quite possibly a factor, this seems likely to be a minor contributor to the changing physical form of human settlements so there will be no further comment. The question of recommendations specifically dealing with remote consultation is left to another time and place.

KEYWORDS FOR INDEXING:

Health, delivery services; Urban spread

* Parsons and Williams, Forecast 1968 - 2000 of Computer Developments and Applications, Nov. 1968, p. 24.

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Health

A2

INITIAL IMPACT ESTIMATE:

2. When and if corresponding technology comes into use in the home, the "house call" may finally return, raising the general health of the community in the process. This may take a while since my impression is that even Picturephones will not provide the requisite definition. Interestingly enough, the same sorts of predictions were made for the automobile, particularly for increasing the level of service in rural areas.* To the best of the author's knowledge, the predictions were correct.

SCENARIO STATEMENT AND TASK:

If city streets continue to be dangerous, the remote house call may be a real boon to health care. TASK 84: What might be done to encourage adoption of the technology? Find out what is being done now and determine whether further action seems worth the effort of pushing for it.

KEYWORDS FOR INDEXING:

Health care, delivery systems

* James J. Flink, America Adopts the Automobile, 1895 - 1910, (Cambridge: MIT Press, 1970), p. 107.

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Health

B

INITIAL IMPACT ESTIMATE:

- B. As part of health care delivery programming, information on drug programs could be presented.

SCENARIO STATEMENT AND TASK:

No further comment seems necessary at this time.

KEYWORDS FOR INDEXING:

CATV; Drugs

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Business A

INITIAL IMPACT ESTIMATE:

A. There may be well over a million jobs for "information middle-men"-- the interpreters of information demand-- by 1975.*

1. At least in the mid-seventies, it would seem reasonable to expect that such "middle-men" would be located mostly in urban centers which are also communications centers (e.g. New York City), if the profession actually grows. As time goes on, if the information network grows and computer matching systems come into common use, there seems no reason to assume that these professionals will not operate from their homes or from specialized communications centers located in pleasant surroundings. It does seem possible that some sort of personal access to physical facilities will remain necessary and that they will stay in the city as long as the information nodes remain in the cities, but neither of these seems at all certain.

SCENARIO STATEMENT AND TASK:

It is difficult to say how many "information middlemen" there are today and to know where they work and why is more difficult. TASK 85: If you are interested in influencing where those people live and how many there will be, first find out what is happening now, even inexactly. Let me know. If the problem seems interesting at that point, we can take

* James H. Binger, "The Computer, Engine of the Eighties", Advanced Management Journal, January, 1967, p. 25.

INITIAL CATEGORY/OUTLINE

Business

A (cont'd)

it further and look at future alternatives and present actions.

KEYWORDS FOR INDEXING:

Information middlemen; Business; Entrepreneurial opportunities

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Info Net A

INITIAL IMPACT ESTIMATE:

- A. The information net and computers will make it theoretically possible for people to organize into political units that are not geographical.* This does not seem likely to this author; MITRE lists it as a possibility for the late '70's and '80's.** In any case, what if?

KEYWORDS FOR INDEXING:

People groupings; Information net; Political units

* Herbert Goldhammer, The Social Effects of Communication Technology, A Rand Report, R-486-RSF, May 1970, p. 11.

** O'Neill, op. cit., p. 92.

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Info Net

A1

INITIAL IMPACT ESTIMATE:

1. Such a reorganization would likely have a real impact on communities and would probably come as a result of a basic change in attitudes as to what constitutes one. Political districts now seem organized around history, political power bases, and physical services (of years ago). The new boundaries presumably would be centered about contemporary images.
 - a. Might lead to breakdowns in some of the benefits of communities of propinquity (e.g. it seems possible that if primary links to others were formed by common interests regardless of propinquity and chance, that communities might be at least as homogeneous and as segregated as many today.
 - b. Might lead to more cost-effective delivery of some services if boundaries were more mobile; I do feel compelled to repeat that the existence of technologies that might make boundaries more mobile will not necessarily do anything to the political boundary-fixing process.
 - c. It might compel questioning of the philosophical basis of what ought to constitute a political subdivision. TASK 86:
Do just that.
 1. It is worth questioning because any such reconstitution would likely have power-redistributing effects. This may be something that a right-thinking person would favor or heatedly

INITIAL CATEGORY/OUTLINE

Info Net

A1 (cont'd)

reject, depending on likely consequences.

KEYWORDS FOR INDEXING:

Political boundaries, units

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Power

A

INITIAL IMPACT STATEMENT:

INTERACTION WITH THE SUPPLY AND THE PRICE OF ELECTRIC POWER AND
OTHER RESOURCES MAY HAVE IMPORTANT INDIRECT IMPACTS ON COMMUNITIES.

- A. Many estimate that the price of power will soar to several times
its present level by the turn of the century. Because power
is a relatively small part of the cost of communications,
this seems unlikely to influence the price of communications
as things presently stand.

SCENARIO STATEMENT AND TASK:

TASK 87: What is known about the demand for power in various
segments of the present and future communications industry? Is the
possible explosive growth of this industry likely to drive the price
of power significantly higher than presently forecast?

KEYWORDS FOR INDEXING:

Prices; Electric power, price of

IRAS IMPACT SHEET

INITIAL CATEGORY/OUTLINE

Name(s): SCE

Planning

INITIAL IMPACT ESTIMATE:

THE NEW TECHNOLOGIES MAY HAVE SOME POSITIVE IMPACT ON PLANNING
AND POLITICS THROUGH THE SUM OF THEIR IMPACTS.

SCENARIO STATEMENT AND TASKS:

Putting on rose-colored glasses and momentarily forsaking the operating philosophy of this thesis, I will make no recommendations but express the hope that, through impacts noted above and by the increased ability to pool brainpower and access information, and through increased time which men may choose to devote to the art of government, we may yet see the general adoption of more systematic, human-scale planning procedures.

KEYWORDS FOR INDEXING:

Planning, goal-oriented

MY FAITH IN DOCTORS

My faith in doctors
is immense.

Just one thing spoils it:
their pretense
of authorized
omniscience.

Piet Hein

CHAPTER IV SUMMARY OF IMPORTANT RECOMMENDATIONS AND THRUSTS

A number of stabs have been made at writing this section with unsatisfactory results. Time has run out and one of those drafts must be used.

The unsatisfactory part comes from the nature of the method's application. The problem attacked was to range over the aspects of human settlements and see how the new communications technologies might have impacts.

Communications were selected because of their importance and the expectation that the impacts would be many and important. In this first iteration of IRAS, that expectation was fully satisfied. Indeed it is difficult to summarize the wealth of material without becoming so surface that the section is worthless for a reader who has not gone through the length of Chapter IV and seen the reasoning behind the labels and slogans that will be found below.

What will be found here, aside from advice to read the chapter if you have not so far, is a summary of some of the themes touched in the preceding hundred pages. They are in no particular order.

There is a high degree of application of new technology to educational institutions. Among the possible impacts are new institutions, unexpected psychological impacts, politicization of curricular processes, more goal-oriented planning in practice, a more functional philosophy of education oriented more toward skills, and increasing competition and conflict. To repeat, these are a few possibilities brought out in the chapter. The reader is advised to use the index to check into areas of particular interest.

Psychological impacts seem a possibility in a number of areas, particularly in schools, applied advertising, from dreamies (see p.198) and general changes in attitudes and values. There is no necessary implication that such changes are undesirable; a number of them seem to be to this author. The sum of the recommendations are to look more specifically at possible impacts and to devise indicators that might be able to pick up certain kinds of psychological changes in average styles of learning, propensities to violence, initiative, passivity, tendency to work in groups. Some of these changes could be important, just as the possibility that television today may be breeding a new generation of violence is not taken lightly. There are needs for general societal indicators somehow sampling throughout the country and more research into specific impacts from specific media uses.

In education, the possibility seems significant that the new technologies could enable some new philosophies of curriculum to be tried once production levels of cassette and CATV subjects rises to threshold levels. One is the idea of "unique resources," that most of the on-site teachers/faculty would have expertise in a relatively narrow range of specialization, with much of a broad basic curriculum being imported electronically; this would permit schools to deeply develop their own unique resources for on-site use and for electronic export. Recommendations concern feasibility studies and plausible new institutions.

In education and elsewhere, there is emphasis on planning physical facilities. They last for a while and should be designed with enough flexibility to be retro-fitted with new communications technologies

and to be used as buildings might be used over the next quarter century. A lot more thought is necessary in this area to figure out what that last sentence means in terms of blue prints; flexibility is fortunately a coming movement in architecture.

Access to media surfaced a number of times: the need to guarantee access to community groups as well as to individuals; the role media might play in starting new community institutions; access to curricula in schools.

It has been difficult to get hold of issues of centralization, decentralization, human scale design of networks and systems, alienation. There seem to be a lot of risks riding with high degrees of centralization and with inflexible designs, the greatest being vulnerability to sabotage and guerilla activity but also including wholesale revulsion from technology and from unresponsive institutions, less spectacular but more potent. Lot more thinking required.

Jobs. Who will get put out of work and what will the new technologies do to the typical process of defining the typical job. Communications technologies play a significant but small role here: growth of leisure time, changes in productivity, changing demographic patterns, unions, international competition all have a role. Few recommendations because I could not think of anything that might encourage or discourage change in this area. Indicators were recommended to keep track of change if possible and get discussion going. I have not read any automation commission reports yet.

Politics could get hit fairly big but the options seemed low probability to me. The kinds of change necessary were more human; there will be increasing potential for public access to community processes, for damage-query, for instant movements and for deep-seated dissatisfaction if

the media and computers are increasingly used to increase efficiency and the potency of the leader's word. I see politics as a dependent variable; if other things in the media and in society get clicking, the politics will pretty much take care of itself; if not, nothing much will save us from the dangers cited above.

The threats to privacy are well-known, almost certainly not exaggerated and have the potential to grow much worse if safeguards are not stringently designed in from the very beginning, meaning now. I am making the comment brief because the item is under discussion; it is extremely important and a failure here will trigger problems in other areas, I suspect.

There is a potential for less use of transportation for two reasons: 1) the relationship between transportation use and communications use is not really understood and therefore anything could happen and 2) pollution and congestion in various areas combined with an increasing potential for effectively doing business and pleasure by wire might force a shift that might otherwise have been complementary growth. No recommendations beyond more systemic planning and keeping an eye on trends.

A potential for withdrawn communities was noted, people who settled down in one place used the media and tried as much as possible to avoid contact with an unpleasant world. Dreamies, a sort of electronic narcotic/pornography/art, jibed in with an increasing ability to drop out.

A large number of new services will be opening up for communities, including job services, community information, emergency services, and the like. Communities be advised to revamp planning techniques, figure out what you want and how much you might be willing to pay for it. Opportunities for new services at varying costs will grow.

Other issues touched were potential for increasing corporate power, influences on size of conurbations (confusing), remote buying and electronic money, new techniques for holding conferences, and alternatives to cities. At this level of detail, you might as well read the chapter if you haven't already.

The types of issues touched upon are mainly a function of the author's biases. They were selected from a previous paper(Appendix IV) in which impacts were set down as they occurred to the author; the impacts for this chapter were largely chosen by going through that paper, diverging when new thoughts hit and stopping in the middle of the original draft when it was clear that there was plenty of material to cope with already.

I would appreciate your comments on this chapter particularly.

CHAPTER V: ASSESSMENT OF PLAUSIBLE IMPACTS OF EDUCATIONAL USES OF
CABLE TELEVISION ON LYNN, MASSACHUSETTS

Definition of the Problem

Definition of Lynn, Massachusetts

Results of Lynn Study

1. The educational system
2. Impacts on institutional structure
3. Integration
4. Direct impacts on the economy
5. Impacts on population
6. Impacts on culture
7. Psychological impacts
8. Impact on communications systems
9. Impacts on sense of urban and group identity

Recommendations: Part I

1. Total planning
2. Education-- immediate needs for action
3. Physical facilities
4. Curricula
5. New institutions
6. Goals and planning

Recommendations: Part II

PLAUSIBLE IMPACTS OF EDUCATIONAL USES OF CABLE TELEVISION ON LYNN,
MASSACHUSETTS

At the same time that the thesis was being written, I was part of a team looking at the feasibility and educational uses of cable television in Lynn, Massachusetts. The material below is both part of the report of that group and part of the thesis.

The results that follow are not entirely satisfactory although they did meet team objectives set at the beginning of the project. With the time and resources available, it was not possible to get a significant feel for the dynamic of the city nor to do any significant data collecting or modeling. The results are therefore fairly general for the most part and concern opportunities more than impacts.

The project team consisted of:

David Bernstein (MIT), feasibility and financing;

Nerea Ryder (Wellesley), immediate educational uses of cable;

Stephen C. Ehrmann (MIT), long term educational uses and their impacts;

Oscar Jackson (MIT Community Fellow; head of CATV Information Service), consultant;

Donald A. Schon was instructor for the subject, "Technology and the City."

DEFINITION OF PROBLEM

In a contract written to define the study, the author agreed to use IRAS (Impact Ranging by Alternate Scenarios) to speculate on the nature of plausible impacts of educational uses of cable television on Lynn, Massachusetts. As the study progressed, the problem was further defined.

The time period was defined to be twenty-five years into the future.

The primary aim was to be the location of as many plausible impacts as possible; no chronology of impacts was devised.

For the purposes of this section, it was decided to look at new electronic communications as applied to education and not just at cable. In practice, this has meant CATV, cassette television, and teaching computers used remotely. A technology forecast by James T. Martin (see Thesis, Appendix II) was used for estimates of adoption of educational technology.

The recommendations are addressed (hypothetically) to people concerned with planning and governance in Lynn.

The major conclusions of this study are the result of one iteration of the IRAS technique (explained fully in Chapter III of the thesis and largely based on the case study in Chapter IV. Part of the results of the study are suggestions for a possible second iteration.

The study was planned to be performed and written over a three week period. As it happened, the period was extended, but goals and tasks were defined with about a forty hour commitment in mind.

DEFINITION OF LYNN, MASSACHUSETTS

In practice, it proved difficult to get a feel for the future dynamics of a city never visited before the project began. For the purposes of this section, therefore, "Lynn" may be defined as the sum of the facts listed below which proved specifically relevant to the results plus some impression gleaned from a visit to the city.

In random order, the facts are:

1. Lynn is on the North Shore, eleven miles from Boston.¹
2. Lynn has listed as recreational facilities one golf course and one MDC beach.²
3. Lynn in 1965 had a population of 92,653 in decline from a high of 105,000 in World War II.³
4. The biggest industry by far in Lynn is General Electric which makes aircraft engines there. The firm has been in Lynn since 1883 and its trend toward higher productivity, higher wages and fewer employees has been a major force in Lynn since World War II at least.⁴
5. Another major cause or symptom of the decline of Lynn is suburbanization.⁵
6. In 1968, sixty per cent of the workers resident in Lynn were in manufacturing, a total of 22,635.⁶
7. In 1960, persons of twenty-five and over in Lynn had completed a median of 11.0 years of schooling. In the Boston Metropolitan area, the comparable figure was 12.1 years. In Lynn, 42.3% of the same population had completed high school while in the metropolitan area,

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1. Lynn Fact Sheet obtained from their Planning Board at City Hall, Section III.
 2. Ibid., Section III.
 3. Ibid., Section B-1.
 4. Lynn Community Renewal Program, 1965 - 1980, 1965, p. A-11.
 5. Ibid., p. A-11.
 6. Lynn Fact Sheet, op. cit., Section VI. A.

the figure was 53.4%.⁷

8. In 1960, Lynn was 98.4% white and 1.4% black. The comparable figures for the metropolitan area are 96.6% and 3.0%. In 1960, 43.0% of the people were of foreign stock and 12.8% were foreign born. Of the 40,637 persons of foreign stock, 36.9% were Canadian, 13.5% were Irish, 11.1% Italian, 8.4% United Kingdom, and 7.3% Russian.⁸
9. Lynn has two high schools, one a technical high school that has just opened and which has an extensive closed circuit television installation including a studio and hookups for monitors in every classroom.

7. Ibid., Section II. B-4.

8. Ibid., Section II. B-3.

RESULTS OF LYNN STUDY

IRAS is an iterative technique; summarized immediately below are the results of the first iteration. Following this section are suggestions for changes to be made for a second round. A number of changes in the scenarios and information backup are necessary so the results below can be treated as no more than suggestive. In the conclusions, the word "Lynn" should be treated as synonymous with "Lynn or institutions serving Lynn". A complete explanation of the background and operation of IRAS and results on which this study is based may be found in the first few chapters of the thesis.

1. The educational system

The type of impact that actually occurs will depend heavily both on national precedents and on the types of educational technologies in use in Lynn over time.

The impacts below are drawn from more detailed work done in Chapter IV of the thesis. Readers interested in greater detail or in the particular contribution of IRAS should read the denoted sections.

The material was not reprinted in full for the cross-referenced impacts because no unique Lynn contribution to the impact was identified.

The impacts are not listed in any particular order.

- A. There may be unexpected psychological impacts on students from the teaching medium, no matter what that medium is (including traditional ones). Impacts might include influences toward passivity, violence,

good citizenship, added initiative, or anomie. See page index in thesis. See "7. Psychological Impacts" below.

- B. Lynn educational systems may serve more than their traditional clients in the future; the new students may include employees at their jobs, career people, people traditionally classed as elderly, and people who spend most of their time at home and who wish to be educated there.
- C. The educational system may become more politicized if times are strained. The setup of the system will have a great influence on the degree of politicization. A possible provocation for conflict would be the expected ability to access large numbers of subjects taught in varying styles through the media of cable television or cassettes. Groups may demand that specific types of instruction be further emphasized or made available. It is possible that impossible situations may arise similar to unions and equitable wages; it is always possible to find workers in similar jobs who make more. Likewise, if this becomes an issue the conflict may be unresolvable as pressure is placed on education to use more subjects of a given type (oriented toward a given ethnic group, for instance). The limiting factor is the financial capability of the institution to continue to gain greater and greater access to educational resources.
- D. Lynn may develop unique educational resources to attract students and to sell to other educational institutions. One of the areas of specialization may be Lynn itself. Lynn may take advantage of coming opportunities to begin a college based on the new technologies, buying or leasing tapes or live remote classes and developing local, unique resources.
- E. Lynn's educational systems may be influenced by her local economic system and state which seems on the face of things to have a variety of possible futures. The influence of General Electric could produce either a more function/skill oriented education or one oriented toward attracting a broader economic base, for instance.

- F. The variety of educational institutions in the city may well increase to serve the new sets of students mentioned above, frequently using the new technologies and bringing competitive pressure to bear on the school system.
- G. Depending on the form in which the new technologies evolve, non-public schools may be affected quite adversely or most favorably; at the level of detail at which this iteration was conducted, the technologies appear able to either save or destroy large segments of the non-public secondary schools, for instance.
- H. The schools may shift from their physical centers of today toward new physical forms, opening present schools for a variety of year-round uses, including their old ones. The schools could become even more of a drain on school budgets as well, in some circumstances (e.g. increasing private school enrollment).
- I. The quality of the education could vary in almost any conceivable way according to the specific technologies in use at the time and the way in which they are used.

2. Impacts on Institutional Structure

In this iteration, the only community institutions investigated were the public schools. There are quite a few change forces operating or likely to operate on the schools including: the new communications technologies and the associated changes in educational technologies; a decreasing number of students because of presently predicted demographic changes; teachers unions; rising costs; competition from new educational institutions; changes in the user population due to rise in leisure time, technological unemployment, lower retirement ages, and new educational opportunities.

These forces in various contexts might force schools to use more

goal-oriented planning; might force the public schools into severe financial difficulties; might strengthen competing educational institutions, both traditional ones and new brands; might ultimately result in new controlling structures for public schools based on new distributions of power and partly owing to the disruptive change force of the new technologies; might result in new role definitions within the institution, particularly for teachers; might change the community function of public schools to include educating other groups and/or acting as community centers for information and communication (using the communications equipment in the schools); might force other changes in school structure or function unanticipated by this author; might result in no substantial institutional change at all.

3. Integration

Lynn's black population is on the order of a thousand, according to the best information that the author has been able to locate. This situation may not always remain so.

New educational structures (see "1." and "2.") may result in easier and more constructive integration for present and future minority population. For instance, specialized centers and frequent movement as part of the educational plan could result in large components of the education being from outside the home neighborhood; in some cases the student would go to the center; in others, it would come to him through media. This is of course just a possibility. It does seem plausible, however.

This sort of system in turn would have impacts on general educational quality and on the evolving culture of the city; more on the latter topic below. I do not find the above policy particularly, but it seems a possibility; it is under discussion for application in Boston, for instance.

4. Direct Impacts on the Economy

The economic base of Lynn seems to have many possibilities open to it at this iteration; some may stem from a lack of basic research. Some possible impacts/opportunities:

- A. Educational uses of cable television may be extended to employees of companies in the Lynn area, a service that would seem likely to increase Lynn's attractiveness as a place for firms to locate, particularly if she led other communities in adopting it. "Classes" could be held at work or at home. (This application is not necessarily a net benefit for the city; that is a question that should be very carefully analyzed before action is taken.) Factors to be kept in mind include costs of increased demand for services including educational, environmental costs, long term land needs, net contribution to job market, etc. caused by arrival (of new firm).
- B. Innovative educational programs may help to attract a higher income population to Lynn, again particularly if Lynn leads neighboring towns.
- C. Through educational programs training and attracting new people, and if the economic base becomes more flexible, Lynn would probably be in better shape to withstand times of rapid change or depression. The same might be true if her base was rigid but devoted to a more dependable sort of product whose demand would remain high through various sorts of alternative circumstances.

- D. It is not my intention at this level of detail to discuss financing of innovations or of the recommendations in this report. The method of financing new educational programs will have impacts on the city. What if the industrial programs were financed jointly with the industries? What if Lynn financed the programs completely from taxes and controlled them locally? What if the programs were produced and distributed privately? What if the programs were managed by a consortium of cities? The resulting impacts on local institutions, the industries involved, companies considering moving into the area would be varied. I suspect that the Lynn government will wish to pay as little as possible and will not consider program control an important issue. In this case, few specific benefits may accrue to the city either. Use of city facilities may be a leverage point depending on the specific system in use and the sorts of rights and facilities retained and run by the city and its schools.
- E. If the curricula encouraged a work force oriented more toward a service economy, there might possibly be slight impacts on Lynn's economic base in the long term.

See also "5. Impacts on population" below.

5. Impacts on Population

- A. As indicated above, in many circumstances, innovative educational programs could attract a higher income population to Lynn. If better programs were available elsewhere or if new research condemned the new methods, things might not turn out so well. Other issues such as housing, taxes, level of services, et. al. have a potent role to play, as well.
- B. In addition, the education may have the impact of giving more of Lynn's young enough education and skills to move away to high paying jobs if there are not commensurate opportunities in the city. If services are available for starting businesses, it might

be argued that the more entrepreneurial of the graduating classes might stay and try to start something.

- C. If the educational institutions cater more to the elderly, more may move to Lynn; the author presently has no data on the movement patterns of Lynn citizens as they get older.
- D. More people may stay in Lynn if a unique educational resource were developed around the city itself. Students who studied the government might stay and go into politics for instance; see also the section on urban identity below. See also thesis index.

6. Impacts on Culture

As noted above, Lynn presently has a high concentration of foreign-born citizens and a very high percentage of "foreign stock". The demographic patterns may change considerably over the next twenty-five years.

Depending on how access to educational systems is arranged and guaranteed and on the structure of planned programs, Lynn's educational systems may work to enhance the cultural heritage or to give people more common ground or to diminish the influence of the older cultures or some combination of these. The alternatives do not seem very limited at this point.

Lynn's "cultural relationship" to Boston may change as students tap new types of cultural resources, getting either a bigger taste of the central resources (e.g. Boston Symphony, museums, Chinatown, Commons and Public Garden, North Dorchester) or learning to develop and use local resources or to pipe in whatever resources are desired (via high

capacity cable or cassettes) from all over the world. Either alternative (growing closer or growing away) seems possible. Traditional culture may decline. Lynn itself may become a center.

Changes in the schools and their role, particularly when considered in conjunction with various sorts of political alternatives, seem likely to generate some new kinds of culture.

7. Psychological Impacts

The reader is referred to the sections in the thesis, Chapter IV for fuller details on psychological impacts. Use the index.

To sum: there is a question of whether telecommunications based education might make children more passive, accepting authority, willing and eager for simple solutions, etc.

There also seems a possibility that response-oriented television, particularly in combination with computer programs providing individualized resources and instruction may give a more active and personal touch to the education than is there in the present.

In combination with various political solutions (perhaps, in part, causing them), feelings of alienation, anomie or rage against technology may develop from experiences with automated education at an early age.

8. Impact on Communications Systems

Communications systems are defined for the purposes of this report

as those ways in which people transmit information within or in/out of Lynn.

Because education promises to be an important application for cable systems, a successful educational program could lead the city to further wiring. It seems at least as likely that the city will be wired before the programs are well under way. Use of cable, the systems built within the schools, and skills learned in school seem likely to lead to new applications of the technologies and further capital investment in communications.

Use of IRAS suggests some alternatives to the above, specifically that 1) the money may not be there to make the capital investment, 2) unless careful planning is used, the several bases for expansion of the communications network (local cable operations, telephone company, school communications systems, post office, data transmission networks) may get tangled and jointly slow development, 3) the people of Lynn may wish to slow development until they get adequate guarantees of privacy and access, 4) movements against conspicuous technology could slow or stop investment in this area. The promise of a diverse pluralistic communications system is there and that promise may possibly be fulfilled, but probably not without a little "guidance" from Lynn itself.

9. Impacts of Sense of Urban and Group Identity

Impacts in this area are partially dependent on what policies are followed by various city agencies over the coming years, and partially on other external factors.

If a concerted effort is made to establish a curriculum centered around Lynn itself (perhaps using time made available by lectures delivered by the new technologies, for instance), studies centered around questions of the identity, operation and change of parts/districts/systems of the city may result in a greater knowledge and greater concern with Lynn, an identification with the city perhaps greater than that which now exists.

Some other things may happen, too, as brought out by the scenarios.

There may be some real conflict raised because of students "sticking their noses into everything", either because of student action or because people get tired of being bothered.

The program may fold because of lack of tangible results for the students or the city.

Any movement toward urban identity may be overpowered by movement toward ethnic identity (see "6. Impacts on Culture".).

If the electronic systems run into trouble for other reasons (costs, research damning the media's psychological impacts on students, anti-technology or anti-institution movements), the whole program might be working and still go down the drain.

The school may become extremely politicized as various groups strive for control of programs, leading to a scuttling of the use of media and of the activist type of program.

There may be a backlash against any attempts at overt indoctrination

or socialization.

For a fuller view of the shoals on which this technology might run aground, read through Chapter IV of the thesis.

RECOMMENDATIONS: PART I

These recommendations are drawn directly from the preceding section and from material in Chapter IV and should be taken only as prelude to a thorough study. As will be seen in the remainder of the thesis, there were a number of constraints placed on application of the methods used here.

In addition, the reader will have his own ideas as to priorities and forms. With these caveats set down, the following recommendations are offered.

1. Total urban planning

A. As brought out in the preceding sections, adoption of new communications media for educational purposes is likely to have broad-ranging consequences, presenting both opportunities and hazards that reach far beyond the school systems and into the future. The decision of whether to adopt the technology is one in which urban goals ought to be considered, not just educational ones; in which all possible information is brought to bear; in which all options are considered. The potential benefits and hazards both appear at this range to be of some magnitude. Chapter IV of the thesis contains additional recommendations in this area in its sections on education.

B. As part of the goal-setting process, it ought to be decided whether concerns over the city's economic base have any explicit role in determining the curriculum in the schools.

If so some guidelines should be set up, particularly with regard to the relationship with General Electric, the types of skills taught, attempts to attract certain types of firms or institutions.

What would happen to Lynn if General Electric closed its operation entirely and permanently? What sorts of attitudes should students be encouraged to have toward various types of work? These questions have to be considered in a larger context.

2. Educational planning: immediate needs for action

C. Lynn ought to consider how best to utilize her existing communications investment in Lynn Vocational and Technical Institute (closed circuit television system and studio, all under-utilized in the extreme, all new) and her power to grant franchises for cable television operations. Some conclusions should be reached before any franchises are granted; the franchise decision is now in process so this is a high priority recommendation.

From these bases, Lynn may be able to advance her goals, which may (or may not) be to improve her educational institutions to a point superior to other cities in the area. Such a step would have large impacts, providing education retains its importance to parents on the move in the future and providing parents keep moving and providing that education retains a large geographically-constrained component. These "ifs" emphasize the necessity for flexible, multi-option planning and an informed citizenry, capable of backing and supervising long term projects. See " 8. Impacts on Communications Systems".

3. Education: physical facilities

D. Lynn ought to immediately study the possibilities for more complete use of the school buildings. Such uses will probably grow but it seems unlikely that they are utilized to the full at present.

If Lynn is to adopt easily to future forces toward new images of school facility use, she might best start in the present with uses that have nothing necessarily to do with the new communications.

E. Educational planning means planning physical facilities that will have to serve the city in the far future and "planning" education for people who will also have to serve in the far future. There is no time like the present to begin making the planning process for facilities more goal- and process-oriented. As IRAS indicates, investment capital can always get scarcer than it is at any point in time. If Lynn can free itself from the plan-a-school syndrome, it will be in a much better position to take advantage of all available resources to improve the total educational process and advance the city in the direction of its goals. Anticipation of new uses should probably be equally divided between possible specific uses and designed-in flexibility.

4. Curricula

F. The new educational markets: continuing education for employees, home-based education, services for the elderly, education for new skills and new jobs, etc. all appear particularly important for Lynn. A study ought to be made by the city in the near future, perhaps in cooperation with other area cities and towns, to determine which systems for delivering such programs might be most cost-effective and, based on these conclusions, which rights and franchises ought to be reserved by the cities involved. Joint sponsorship might lead to continuing cooperation and sharing of expenses.

G. Lynn ought to consider what steps are necessary, if it does adopt electronic technologies for its schools, to insure diversity of access to subject matter. One of the real benefits of the technologies is the potential diversity of subjects offered; one of the dangers is rigidity and externally planned curricula. Safeguards must be built into the structure of the system and the minds of the people using it.

H. How are cultural programs and urban identity programs to be used in the schools? Lynn ought to consider the benefits and the risks inherent in each type of program early in the game.

5. New educational institutions

I. If work begins within five years or so on serious planning, Lynn within ten years might be able to set up a unique kind of college. Some of the great universities of the world are close by and once production of remote educational resources at the university level begins to take off (see p. of the thesis), a new campus may be able to be planned on the assumption that it will get most of its basic instructional material via CATV, cassetts, and eventually via satellite directly. That such a school might be planned from the ground up and avert many of the institutional problems of change is an idea that, to the author's knowledge, originated with the author and is offered free of charge.

As early signs of the trend toward electronic education appear, people in Lynn ought to decide whether or not to invest some effort in studying the options, what sort of institution might prove best

for the city, and what sort of resources would be required for organization, initial operation and endowment..

There may be cogent reasons for not carrying out this project. From this distance, however, it looks like a promising prospect deserving more intensive investigation. First Lynn ought to decide what it wants for itself, however; then it can start planning how to get it. This new college concept might be a step in a direction that Lynn wants to go.

6. Educational goals and planning

J. There appear to be many futures open to Lynn. To a great extent, present policy will determine what the future turns out to be. Lynn ought to form institutions and processes sufficient to make some initial goal statements for her total educational program (including all forms of education received by her citizens, even those over which the city has zero control) so that planners will have some sort of basis on which to make recommendations for some of the questions discussed below. This is an awfully tough thing to do but it seems necessary.

K. Lynn ought to decide what measures of educational progress and diversity it wishes to have, see if such records are kept locally, regionally, and nationally, and, if they are not, see that they are kept. No new system can be adequately judged without some idea of what things were like before adoption or how they have changed since.

L. As a city, Lynn might do well to make some decisions as to who ought to control her educational institutions. This is an extremely naive suggestion and might not do any good but, as has been pointed out, the potential for disruption and fights for

disruption and fights for control over curricular emphases may rise sharply and, one way or another, the question ought to be faced before it becomes a matter of losing face.

M. The question of psychological impacts of electronic education is still a question. Educational planners ought to watch the literature and encourage the sort of experimentation that they would like to see. Will cable be a force for heterogeneity and diversity or for passivity, alienation, or anomie?

RECOMMENDATIONS: PART II

These preliminary recommendations are for a (presently) hypothetical second iteration of IRAS and a more serious appraisal of the situation. The discussion is somewhat technical in spots and will be incomprehensible unless you understand how IRAS works (See thesis Chapter III).

1. Involve people in Lynn in the IRAS process. IRAS is made for use by a team and a real, firm knowledge and feel for Lynn is necessary to get a really good assessment plus policy measures with a chance for working there. In addition, unless someone in Lynn is wholly behind the results and pushing, there seems little chance that they will be heard; the author has never lived in the city. Also involve experts with talents in educational psychology, cable, demography, etc.

2. Attempt to assign dates to the impacts and make more precise statements. A precise statement of impact implies data-gathering in most cases and was judged inappropriate for this first iteration.

3. The scenarios ought to be more numerous and more relevant to the problem of educational uses of cable and to Lynn.

Additional sectors need to be added to represent regional economic conditions, precedents for various uses of cable, plausible research findings on psychological impacts, the futures of General Electric, and local demographic shifts, for instance.

I would recommend that aggregated global scenarios be obtained from the Center for Research on Social Policy of the Stanford Research Institute and that new factors and sectors be then melded to the scenarios. New scenarios can be constructed using random numbers on the new sectors to produce new plausible scenes and then sequences. In other words,

each basic global scenario might be modified to produce one or three new specialized, internally consistent scenarios.

As to deciding which sectors to add, the discussion should center primarily around those possible future conditions that might affect Lynn's present planning for educational uses of cable.

Secondarily, factors and sectors should be added to represent conditions that might affect the nature of the impacts of possible uses of the technologies but which do not imply immediate decisions on studies and policies.

In each case, only conditions that might have discussable impacts are relevant. For instance, a statement that "Boston's core is destroyed by a series of riots" is only of interest if someone has an idea of how that could conceivably interact with impacts of educational uses of cable in Lynn. That idea need not be correct; it should however suggest some future possibility not yet considered.

4. Attempt to be more rigorous. Sketch out a different IRAS statement for each scenario examined instead of aggregating as was done this time.

CHAPTER VI: A PARTIAL LIST OF POSSIBLE CONSTRAINTS ON THE APPLICATION
OF NEW COMMUNICATIONS TECHNOLOGIES

A Partial List of Possible Constraints on Application of Communications Technologies

1. Policies or factors which encourage or discourage competing services.

Although the effects are not clear, it seems likely that transportation policies are able to affect telecommunications development.

PROJECT: Encourage research on interaction between communications and transportation. State of the art seems fairly crude. In what circumstances are they mutually reinforcing, in what competitive? What criteria and values are applied by individuals when choosing a medium to satisfy particular types of needs? This seems to be an extremely tough order, a set of projects which will require resources and time. Yet much energy is expended in considering both transportation and communications policy and we have as yet perilously little understanding of the potential impacts of given policies.

2. Jurisdictional disputes which prevent technologies from benefiting from returns to scale. For instance, some educational technologies are not aggregated to encourage innovation, investment in research, and sales efforts. Likewise, if regions cannot agree to pool resources and markets for certain services, none may have audiences big enough to make the services pay. One of the real conflicts apparent is that many of these technologies have the potential of being much less distance and geography dependent than present tools; someone has to make an initial buy however and that someone is likely to be very geography dependent. As pointed out previously, if the technologies are applied, their effects may revolutionize

many concepts of community. In the same sense, it may be the present concept of community (and possibly the vested interests therein) which will discourage those applications.

3. A recent MITRE study* suggests that spending on defense applications for computers may adversely affect their civilian use. It seems to this author, following the analogy of the airplane, that the effect could as easily be the opposite, perhaps following a curve of initial inhibition due to defense buying up the talent, followed by greatly increased growth as the technology diffuses. In any case, the defense budget may well be a factor in the rate of development and diffusion.
4. Specific trends in use areas. If education moves toward more geography-independent programs for reasons other than these new technologies, adoption of the new technologies would be speeded most probably. PROJECTS: As has been stated elsewhere in this paper, to get a more accurate gauge of the alternate futures for any problem area will take a great deal more work centered on that area and not on communications. Use of the Delphi technique, surveys, or social indicators to determine what trends are running and of theory and models to guess why will be extremely important policy tools. At some point of course one must begin to plan and to act as well.

* Hugh V. O'Neill, Computers-Communications Networks. Vol. III of Technology Assessment, ed. Martin V. Jones (Washington, D.C.: The MITRE Corporation, 1971), p. 58.

5. Interaction with personal values. The art of value assessment is in its infancy while value forecasting may be charitably termed fetal. In the forecasting area some grip on the potential interactions between diffusion of an innovation, social phenomena, and the spectrum of personal values in an area is nearly essential.

This listing is meant only to be suggestive.

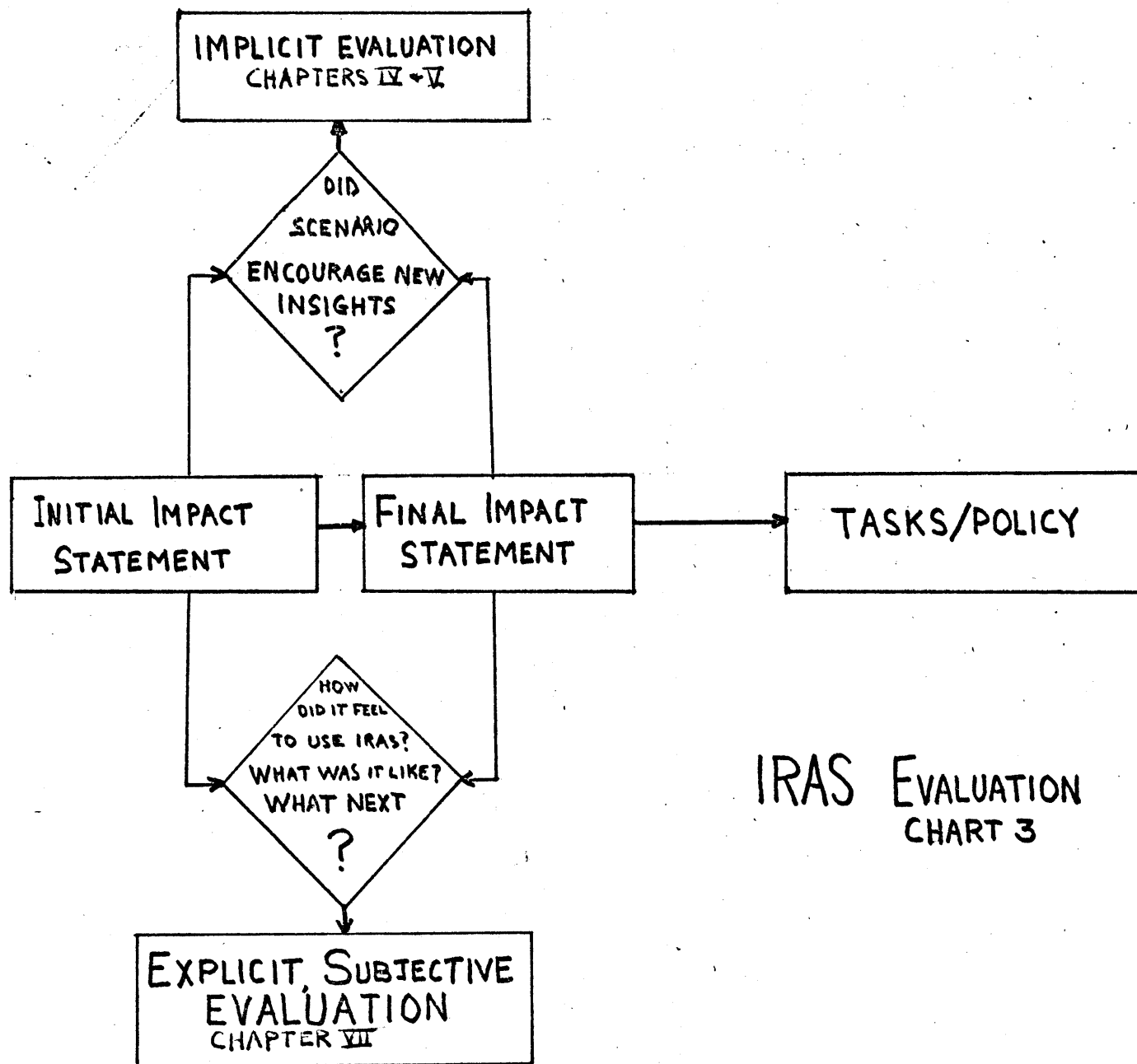
CHAPTER VII -- A PRELIMINARY CRITIQUE OF IRAS

" I know no safe depository of the ultimate powers of society but the people themselves; and if we think them not enlightened enough to exercise their control with a wholesome discretion, then the remedy is ... to inform their discretion."

Thomas Jefferson

Letter to William Charles Jarvis

9/28/1820



IRAS EVALUATION
CHART 3

EVALUATION OF IRAS

The evaluation philosophy is sketched in Chart III (p.250). The contents of Chapter IV and V form one half the evaluation, this chapter the other half.

The evaluation was done this way for a number of reasons.

Assessment methods have in common at present their huge reliance on the insights and skills of their users. It seem nearly impossible to find two people or a collection of people who each might embark on a large assessment project, each using either IRAS or the MITRE method for instance.

In addition, there seems little likelihood that either type of method imposes constraints or biases that might be readily detected by a rigorous examination of the impacts produced; their simplicity and form would seem to insure that the apparent biases would be traceable to the person using the technique. If no comments on changes in spatial distribution of populations appear in the conclusions for instance, the probability would seem to be that either 1) the bias came from the user or 2) the bias has been introduced by the method so subtly that it would be an extremely difficult task to actually determine that the bias has been imposed by the method and not by the user. I am willing to be convinced otherwise but that is the way things seem to me at the moment.

The question of the efficiency of IRAS in increasing the number of impacts remains. The question might have been more objectively addressed than it was in Chapters IV and V if the whole thesis had been planned from the start around this objective.

The work might then have looked like this: a group of individuals would each be given a primal event, some perhaps receiving a technological

innovation, another a trend, and so on. Each individual would be asked to identify one societal impact area of very limited scope, saying as much as possible about the impact and present tasks implied. Each would then be given a set of scenarios and be told about the purpose of the experiment. He would be asked to make additional comments on impacts and tasks that were directly or indirectly stimulated by looking at the scenarios. The results might then be evaluated. Measures would have to be taken to make sure that additional comments were based on the second look and not on second thoughts unrelated to the scenarios. A number of details will have to be worked out before results can be expected to be worth anything.

This type of experiment needs doing. Its goals are incompatible with some of the basic goals of this thesis and so the experiment is yet to be done. The thesis was meant to give the author some experience at assessment and at working on a problem. The evaluation has therefore had to be subjective to a great extent.

1. Summary of the evaluations implicit in Chapters IV and V

The aim of IRAS is to produce a larger number of specific impact statements and tasks than could have been done by "brainstorming methods" (See Chapter III). Page by page, Chapter IV compares the brainstorming approach that produced the initial impact statements with the extra insights that the addition of various cultural perspectives can lend. Chapter V is based on this material and other insights also partly stemming from the scenarios.

IRAS succeeded in this primary purpose. There will be no attempt

to quantify the number of impacts found in each category: their importance, length, and insightfulness vary too much to make a headcount very meaningful. It is the feeling of the author that IRAS increased the effectiveness/quality/number of impact statements by at least half again. You should carefully look through all the material and form your own view. In addition, the number of initial impact areas identified was increased by about one fourth to the best of my memory although this figure is harder to verify as no record was kept as to which initial impact statements were made after IRAS was applied.

Nonetheless, these answers must be classed as tentative in the extreme. IRAS was meant to use Field Anomaly Relaxation to generate a comprehensive set of scenarios; FAR was only cycled once and only two scenarios constructed. The benefits of a full set of societal backgrounds were not gained. As discussed above, the conditions of the case studies were not as controlled as they might have been nor were they designed exclusively for evaluation purposes; nonetheless, the results seem suggestive.

IRAS seems to have worked.

2. Subjective impressions and judgments

The method encourages a very static, cause-and-effect-chain view of societal processes and the future. It would be desirable to somehow incorporate a dynamic view of interacting processes into the core of the method. It is not clear to the author how this can be done or whether, at the outset of problem definition when IRAS is designed to be applied, dynamic models as presently understood would be adequate to such a formless task. It seems clear that in a real test, when results are meant to be used, that followup of specific

impacts ought to include treatment with dynamic models of the indicated processes where they seem equal to the task. Once we know, for instance, that environmental pollution is a problem of specific interest, we can begin to try to model it.

Any modeling technique carries the GIGO* caveat; if one uses mistaken assumptions, results will generally be worthless. IRAS is an impressive acronym and the flow charts may be difficult to trace, but it is easy to become lazy when assessing impacts, to make bad assumptions, to miss whole areas of impacts, to make poor predictions. The ethical researcher will plaster his results with the warning that in general, those findings are only as good as the minds that created them and the chains of reasoning and evidence that sustain them.

More time and space might have been devoted to those impacts which seem unlikely in the context of conceivable futures, with an explanation of why they seem unlikely. There were three reasons why this was generally not done in this study.

1. The author occupied with questions of what might happen, an easier question with which to deal
2. The operating team, in this case the author alone, did not have sufficient expertise or gut instinct to deal with complex questions of why something is unlikely to occur
3. It is still questionable as to the relative value to planners of general statements about lists of things not likely to happen. Unlikely possibilities seem likely to be ignored as it is, even without people being explicitly told that they are unlikely.

*Garbage In -- Garbage Out

IRAS has as strong a tolerance for ambiguity and contradiction as its operating team and encourages identification of contradictory impacts. It can contain contradictory assumptions about the nature of society and deal with them. Because of its tolerance, it can be used to work toward policy alternatives suitable for dealing with contradictory future possibilities. It has only as high a tolerance as the users, however, and that fact too ought to be remembered.

The process takes more energy than I thought it would. Because IRAS is an iterative technique and because the whole idea of the method consists of a groping into an unstructured spectrum of hypothetical ripples emanating from a single event, a lot of very hard thinking is required and a lot of time.

The remainder of this section of the chapter is devoted to some more basic discussion. IRAS may be divided into two parts: its themes and the ways those themes are carried out. The preceding discussion has concerned the latter part.

The first part are the ideas and methods of evaluation are hard to come by. The basic ideas:

1. Assessment can be more usefully done if the idea of alternate futures is an integral part of the effort
2. Scenarios are a good way to insert alternate futures

Discussing the second idea first, only two methods for incorporating alternate futures into assessment have been devised by the author to date. The first is by scenario, the second by a consideration of alternate conditions in given areas. The second just means going through the FAR scenario making process as described in Chapter III but never constructing scenes or scenarios; the sector/factor lists would be used directly in conjunction with the initial impact statements.

The sector/factor lists have the advantage of always putting all the alternatives before the user, the disadvantage of missing the verisimilitude and patterns of the scenarios.

In the case studies, there did not prove to be a great deal of difference between having several scenarios around and looking at the sector/factor listings and using IRAS by the book.

IRAS by the book is still preferred. Scenarios lend a sense of detail and immediacy hard to get from the sparser sector/factor lists and force the user to confront certain details that might be casually ignored if confronted by all alternatives simultaneously in the lists.

The first of those two basic ideas above, that assessment is more "usefully done" with alternate futures, is most difficult of all to evaluate. "Usefully done" must ultimately refer to ultimate users and that means application in practice and prolonged observation and measurement of some type. The author hopes to apply IRAS in future work, hopes in addition that others will use the method and evaluate, but none of these things are in the present.

I cannot justify this first ideas through evidence from the case studies and, indeed, would support the idea even if evidence from these case studies somehow appeared to contradict it. If the future itself can most usefully be visualized as a set of alternate futures (as indicated by the results set down in Appendix I, the growth of decision analysis and multi-option planning), then assessment must also incorporate alternate futures.

The remainder of this chapter is concerned with suggestions for future users of IRAS.

3. Suggestions to future users of IRAS

In an operational exercise, results will probably improve. IRAS is a planning/policy tool primarily and should be used in circumstances with a real commitment to action.

In line with the above, there ought to be a stronger commitment to precision in the impact statements, where ever possible offering quantified statements that will make it easy to determine by consulting reality to determine whether an impact has occurred or not. This will be useful for the future, but even more important should provide an important discipline for the present.

More aids to thought like Appendix III ought to be constructed and discussed in early phases of the project to ensure bread coverage.

Scenarios produced elsewhere and illustrated patterns may be augmented with more specialized sectors to produce good scenarios at lesser cost while incorporating the ideas of those who put the basic scenarios together. This idea is discussed at a little greater length in the Recommendations: Part II of Chapter V.

When defining tasks, make sure to define doable jobs with a reasonable expectation of payoff at the end. If you can not think of any, ask for help somehow. Don't be afraid to pose questions without answers. You may even want to create a special class of tasks to contain such questions.

Bring to the job a determination to look at all the angles and ask all the questions, no matter how childish they may seem or how low in probability. This is probably the only place such questions will be asked.

Use a chronology for impacts, incorporating the ones in the forecast and the scenarios, also to create more precision and to give some

set of priority ordering to the tasks.

That concludes the body of the report. The appendices are also valuable and deserve your attention. I hope to hear from you.

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APPENDIX I -- REPORT OF A SEARCH FOR INNOVATIONS LIKELY TO HAVE
MASSIVE IMPACTS ON CITIES

Introduction

First Questionnaire

Second Questionnaire (includes results of first)

Results of Second Questionnaire

INTRODUCTION

This study was intended to locate a menu of innovations that seem likely to have massive impacts on cities. After some preliminary clucking, it was decided to assemble an expert panel and ask them the question.

Funding was provided by the Undergraduate Research Opportunities Program; Francis Ventre consented to advise.

Each member of the panel was sent two questionnaires, the second based on and containing the results of the first. The two questionnaires are included here along with a partial listing of the panel and results of each questionnaire.

Because its major point for existence was to select a menu of innovations and because I wanted a high response rate, the panel was composed of experts in many areas, all of whom might have some reason for being interested in cities, few of whom were in the same area of work, and almost all of whom were known to the author or to someone else who was known to the author and who could be used as reference in initial contact. The panel was international, some of its members quite wellknown, and its areas of expertise included big city politics, electrical engineering, transportation, economics, labor relations, drugs, psychology, political science, community organization, history, housing, future studies and many others as well.

The first questionnaire was devoted to getting a first set of innovations. I also wanted to investigate the images of the future that each panelist had; each answered a set of multiple choice questions about the part of the next thirty years in which the major impacts of the innovation he suggested might most likely fall.

The results of the first questionnaire are included in the second. The answers to the multiple choice questions suggest quite a spread of opinions about the nature of the future.

The second questionnaire asked each panelist to make some judgments and comments about the innovations suggested in the first. The results of the multiple choice questions were displayed. I suggested to each panelist in this final questionnaire that a continuing collaboration might be useful (it has now been decided to go ahead and try out this plan).

In my estimation, the pre-thesis study can be called a success for a number of reasons.

1. At its end, I concluded that an investigation of communications technologies would be a worthwhile endeavor and so it has turned out to be; this possibility had not occurred to me in early thoughts about topics.
2. I felt good about the work after concluding it. Some of it was poor quality, invalidating the data, but most had been fun to do and had achieved its major objectives.
3. A great deal was learned about the strengths and weaknesses of this type of method:
 - a. Pretesting was a necessity and was not done. I learned this on the first questionnaire, forgot, and had it beaten into my skull with the results of the second.
 - b. If the questions are interesting and challenging and the results promise to be of some usefulness, people can be extremely generous with their time, even if, as in this case, they serve totally without remuneration.
 - c. A fair amount of research has been done on methods of futurism and even more on questionnaire research and other types of inquiring systems. I have now read a bit of it and I ought to read a lot more.
 - d. In general, if a researcher needs to get deep or systematic answers from a panel, he needs to do some deep and systematic work first.
4. Some of the panelists seem to have gotten something out of working on the project. Hopefully, all will learn something of value from the thesis since it is all I can give in payment.
5. Some of the data that I collected in this study, while not of immediate utility will be useful in later work.
6. As I indicated at the beginning of the thesis, if you learn anything,

conclude anything, or think anything as a result of reading this little piece, I would really like to hear from you and can be contacted through the MIT Alumni Office, Cambridge, Massachusetts, 02139.

This is the beginning of a search for ideas about the future. The object of the effort is to identify innovations which seem destined to have massive effects on the development of cities during the next thirty years (1971-2001). By getting some idea of what may be coming, perhaps we may place ourselves in a better position to plan and to act.

METHODOLOGY

About thirty people are participating in this study. You represent many more than thirty areas of competence.

Two or three questionnaires will be mailed to each of you between now and mid-January. This first one will be, I hope, self-explanatory (if not, feel free to call me, collect if necessary, at (617) 354-3383). The next one or two mailings will enable you to deal with the initial comments made by your fellow panel members and to try to pick out certain innovations which deserve special attention.

Below is the questionnaire and a set of relevant definitions. Please have your replies in the mail within two weeks. At that time, I will begin processing your replies and putting together the final draft of the next mailing. Thanks again for agreeing to participate.

Things will probably go most smoothly if you read this whole packet and think about it for a while before starting to answer. It should only take a minute or two to actually write down your reply. I would especially appreciate your comments on the study as a whole.

Sincerely yours,

Stephen C. Ehrmann
Westgate 402
Cambridge, Massachusetts 02139
USA

PLEASE RETURN BY
DECEMBER 1, IF POSSIBLE

QUESTIONNAIRE #1

1. Name an innovation which you expect to have a massive effect on the cities over the next thirty-three years. Very briefly, describe the impact.

2. Circle the interval during which the impact will probably peak. Choose more than one if necessary.

1971-75 / 76-80 / 81 - 90 / 91-2001 / don't know

3. I am interested in learning what you think the country and the world might be like when your innovation is beginning to have its peak effect.

During the interval marked for Question 2 (or for 1985 if you circled "don't know"), do you expect a U.S. economic system that is

- a. Prosperous and expanding--basically '60s style free enterprise
- b. Slow growing or stagnant--free enterprise as above
- c. Depression starting under free enterprise
- d. Prosperous and expanding--strong government controls
- e. Unsuccessful government control
- f. Non-expanding successful economy
- g. Growing base of communes, small industry and business
- h. Other:
- i. Don't know

For this and other questions in this series, mark the alternative that seems most likely to you. Most people are not used to thinking in these terms; you do not have to be precise. Just specify the "background" for your innovation's impact if possible.

U.S. Internal Politics

- a. Status quo
- b. Increased Federal Power
- c. Shift of power locus to state/local
- d. Single party government
- e. Direct democracy, multi-party
- f. Radically altered by revolution, breakup, or war
- g. Other
- h. Don't know

U.S. Demographic Patterns

- a. Approximately same population distribution as present; on the way to 300 million people by 2001
- b. Extreme urbanization

Questionnaire #1

-2-

- c. Population dispersal, pastoral; total population stable or declining
- d. Like "c." but highly integrated
- e. Other:
- f. Don't know

World Population/Subsistence

- a. Global population growth rate down; starvation rates stable or going down
- b. Population rates up; famine held in check by increased food production
- c. Population rates up; famines major factor
- d. Population crash due to previous overpopulation, famine, pollution, rising price of resources--social disorder
- e. Other:
- f. Don't know

Internal Violence

- a. Sporadic crime
- b. Pervasive apolitical violence
- c. Visible, low-level insurgency
- d. Covertly supported, low-intensity insurgency
- e. Higher intensity insurgency
- f. Private armies
- g. Other:
- h. Don't know

Personal Concerns

- a. Anxiety, individual solutions
- b. Anxiety, collective action
- c. Achievement-oriented, individual-oriented
- d. Achievement-oriented, collective
- e. Person-centered unfolding
- f. Other:
- g. Don't know

4. Will the impact of your innovation be heavily dependent on the background future you sketched above (or on some background, if you replied "don't know")? yes/no

Changes in some factors will likely have greater effects on your prediction than some others. Which of the categories above contains alternatives likely to have the greatest effect on your prediction.

U.S. Economy/U.S. Internal Politics/U.S. Demographic Patterns/
World Population/ Internal Violence/ Personal Concerns/ Other:

Comment on this or any question. What would you like to learn from this study? Do you think this study will help you in any way?

DEFINITIONS AND BACKGROUND

In the body of the questionnaire, some novel terms are used. Let me set down my operating definitions.

INNOVATION: a new way of doing or thinking about things. For the purposes of this study, an innovation could be a new transportation system, a new politics, a new theory of relativity, or a new brand of instant coffee

IMPACT; MASSIVE EFFECT: if you will accept the hypothesis that the future can be affected by the occurrence of events in the present, then understand that I take "impact" to mean those changes caused by the present event. The introduction of the steam engine, the political party, and parity in agriculture all had impacts on cities.

DEVELOPMENT OF THE CITIES: by this term, I simply mean "change", for better or worse or whatever. Below are some factors which might be impacted by your innovation. The list is only meant to suggest the range of relevance.

population distribution

education levels

quality/quantity of housing

responsiveness of local government to citizen needs

proportion of urban land that is abandoned

inequities in control of resources

average time of travel over a given distance

- degree of diversity in urban culture

A massive impact would either radically affect some one aspect of urban life or significantly affect a number of them.

CITIES: those corporate entities commonly known as cities today, as opposed to towns or metropolitan regions. If you think this organizational form will become extinct or otherwise change, please say so.

This study, by structure and respondents, is mostly directed toward American cities. I do not rule out the rest of the world.

THE NEXT THIRTY YEARS: The innovation you name may have already been made or you may expect it soon. It is the impact which ought to be expected (40% or greater chance) within the next thirty years. If you think that the impact will be felt next year, that's fine.

This study was originally conceived as one way of spotting some things to look out for, developments that might be encouraged or discouraged, or at any rate talked about, before they became burning issues. This still remains the major thrust.

As the study has been developed and defined, several other objectives have been added.

First, one of the most common replies to my invitation was, "All right but (or 'No, because') I am not used to thinking about how the future might likely look; I think about how I would like it to be." Both types of thinking are necessary, I believe, and paired inside single skulls. Who can work successfully for change without some idea of the context? Everyone may want "democracy" but patterns of political activity would change from present modes if most people expected a police state within the near future. Some might work for it, some against but images of the future would and do affect present patterns of activity.

Second, if one is planning for the future, one ought to be making contingency plans. If the Department of Defense can do it, why shouldn't community organizers, planners, and politicians try to devise sets of plans. One might look at the benefits and costs of a project in prosperity, then reevaluate it with an assumption of depression. No one knows what will actually happen, but it seems to me foolish to close off your options because you assumed that in five or twenty years, things would be pretty much as they are now.

Third, if one is predicting a future event, it seems wise to also predict some roadmarks. For example, a future-predictor of 1910 might have said that within seventy years there would likely be a good deal of freight carried by air over long distances. He might have added a roadmark: if within twenty or thirty years, airplanes are flown over the Atlantic and the Pacific, you can have more faith that my prediction will actually come true. In next the questionnaire, you will be asked to suggest one or two roadmarks that will probably occur before the major impact of your innovation, if the impact itself is "on the way".

Fourth, if one is going to put in time on questionnaires like these, the work ought to be interesting and helpful for the person doing the predicting. What do you think?

Westgate 402
Cambridge, Massachusetts 02139
January 24, 1972
(617) 354-3383

Welcome to Round 2:

This is the second round of our study of innovations and their impact on the future of cities. I think you may find this questionnaire easier to do than the last if a bit longer. I appreciated the comments many of you made and have tried to incorporate them into this questionnaire, the second and last of the project.

The purpose of the first questionnaire was to establish an agenda of innovations and impacts and to get some idea of your personal image of the future.

There are three major objectives for this round:

1. To get comments from the entire group on innovations and impacts suggested in Round#1. Topics for comment: new ideas you might have on the date of the impact; relevant trends; additional impacts arising from a given innovation; disagreement with any part of the statement; estimate of importance of the innovation.
2. To get new innovations and impacts not spotted before. Some of you are new to this study, some not, but I hope that you will give serious thought to additional innovations. The ground rules for the first round still stand: you ought to feel that the innovation and the impacts you suggest have at least a forty percent chance of actually occurring; at least one impact of the innovation should be on the cities; the major impact ought to occur within the next thirty years; the innovation may have been already made or you may expect it to be made soon (e.g. a new invention).
3. To suggest an alternate future for this group. It has been suggested that this group continue its discussion of the cities and the future, setting its own agenda as it goes.

If you have something you want to talk out before doing the questionnaire or, especially, if something isn't clear or seems incorrect in the questionnaire, please call me or send a note.

Please return this questionnaire as soon as you can and in any case before Monday, February 14. Give as much time as you possibly can to this questionnaire and make your answers as complete as possible but return it, even if only partially answered.

Thanks very much for your time. The returns have been excellent. A full copy of the results of the study and my thesis, assessing one of the innovation-impact combinations, will be sent to each of you who has participated, probably in June of this year.

Sincerely yours,

Stephen C. Ehrmann

On the following pages of the first section are listed the innovation-impact combinations suggested by the panel in the first round. Beside your general comments, I would like some specific information placed in the four columns on the left.

1. "Three most important"-One of the chief purposes of this study is to point out some innovations to which more attention ought to be paid, either to encourage favorable impacts or to discourage unfavorable ones. Please check (✓) the three innovation-impact combinations which seem to you most important in this respect. I intend to distribute our results to as many different kinds of people and organizations as I can, so think of the results of this study as a very small tool to encourage discussion and select the three where a little more emphasis might do someone the most good.
 2. "40% probability"-When you each named an innovation-impact combination in the first round, you were asked to name one which to you seemed to have at least a 40% chance of occurring. I'd like you to comment on the probability of each of the listed combinations. If you agree that the combination seems likely, just leave the space blank. If you feel the combination to be unlikely, place an "x" and try to explain your reaction on the back of the page.
 3. "Time interval"-When you named your combination in the first round, you named a time interval in which it seemed most likely that the major impact would occur. In this space for each combination please indicate whether you agree with the estimate of the time interval (by leaving the space blank) or disagree (mark an "x" and comment on the back of the page.)
 4. "Expertise"-Put a plus(+) in this column if the innovation falls within the ranges of your expertise.
-

QUESTIONNAIRE 2

YOUR NAME:

I. This first section presents a listing of the innovations and impacts suggested by the panel in the first round. Please list any innovations and impacts that you believe ought to be included for further comment and study. Space is left for these additions at the end of this section.

the Most important (✓)	40% Probability (✓)	Time Interval (✓)	Expertise (+)
			<p>1. Land use policies (tax laws, zoning) which prohibit use of new land for urban purposes. 1981-2001</p> <p>Comment: (e.g. impact of this innovation on society; related developments; likelihood of impacts, etc)</p>
			<p>2. A system of charging people for their external costs could come into being e.g. paying for pollution. The innovation which would have the most dramatic effect on the shape of our cities is one which would charge transportation externalities-- which would charge the auto heavily for rush hour in-town driving and reimburse public transportation. New forms of public transportation would arise as a result. 1981-90.</p> <p>Comment:</p>
			<p>3. Development and acceptance of some simple device for metering the use of city streets at different hours of the day by private cars. One could then charge nearer the full social costs. Effect hardly "massive"; primarily reductions in congestion and travel time, improvement of urban landscape, possibly some de-urbanization. 1976-90.</p> <p>Comment:</p>
			<p>4. Public ownership of all land in U.S., or at very least, public ownership of all development rights. Impact: planning for urban development and patterns of urban growth; end to land speculation; redistribution of income as public corporations capture the unearned increment in land values due to public and private investment in infrastructure; access for inner city poor to land in suburbs etc. 1981-1990.</p>

Comment: (if, in any case, not enough room for your comments, continue them on the back of the page)

5. High speed intercity ground transport. The main impact will be to stimulate the development of distant suburbs or new towns.'91-'01.

Comment:

6. Interactive TV coupled with cable systems. It should provide more and better information and analysis on many issues such that smaller groups can have power access. It may restructure national work habits (if more online computer are available) and national politics. 1976-1990.

Comment:

7. Advent of the supercity..mile high, self-contained, mainly self-supporting. Impacts: new lifestyles, probably closer living. People-oriented, machine-assisted i.e. walking with moving sidewalks,etc. Change in movement patterns--mainly within city. Change of personal property and ideas. Few cars; no reason for great number of styles or personalization of vehicles. Living styles similar as basic size, shape, but many alternatives and options available and creatable, some socialization, with stress on living in groups. 1991-2001.

Comment:

8. Urban core will become exclusively poor and black or puerto rican. Complete decline of stable neighborhood as basis for urban politics. Decline of service function of government. City location for economic activity (marginal interest in "community",local politics) and temporary residence for migrating poor. 1976-1990.

Comment:

- 9.Small scale community ownership and control of the means of production, development etc. 1991-2001.

Comment:

40%
Probability
Time
Interval
Expertise

10. ...the wired city, a communications network which will be advertised as making the public better educated and informed but in reality will be used to purvey pablen. Access to the communications system will be restricted to those licensed by the leaders of the system. The communications network will be video-phones, cable TV in all homes and places of business, computer controlled data nets on people and events, and electronic surveillance mechanisms already in use and undergoing refinement. Such a communications network will be essential to program the populace in the much enlarged urban-suburban world. 1981-90.

Comment:

11. 3.1/2 day work week(or less):1)people play multiple work roles--largely in service sectors. Many new services developed as yet unimagined. 1981-90.

Comment:

12. New kinds of transport--separation of people and vehicles. 1991-2001.

Comment:

13. Sophisticated analyses, specifically urban dynamics, and world dynamics. If it takes hold, there can be rather profound changes in political, economic and social controls. 1981-90.

Comment:

14. Public interest and group involvement in environmental and community impacts of building new physical facilities(all kinds:transportation,utility,housing,etc.) in the city. 1976-1980.

15. Escalating demand on city governments to create and control viable physico-social environments; corresponding growth in power of city governments (and federal and state governments which can only act through them); increased reliance on city governments, with or without increased trust in them. 1976-90.

40%
Probability
Time
Interval
Expertise

16. Increase in demand for housing and in housing production.
Impact will be to accelerate growth and spread of suburbs,
as well as racial and economic integration of older suburbs. 1976-90.

Comment:

17. Replacement of the auto by good "free" public transport.--
Cleaner, less noisy cities with more even temper in the traveller. 81-90.

Comment:

18. CATV-"wired city". Impact: *revise health education civic services;
*potential for increased citizen participation in public
decision-making; *revise business-transportation patterns. 1976-80.

Comment:

19. An improvement in decision making in complex social areas including
cities using systems dynamics as improvement to present decision
structure. 1976-80.

Comment:

20. Widespread use of a three day work week! 1976-90.

Comment:

21. I looked up the word "innovation" and things like "idea" "method" "change"
and "novelty" popped up--somehow I must express that side of me
that feels rather than thinks in attempting to look ahead
three decades. In this vein I could say "massive effect" is
tied into the thermo-nuclear capabilities of techn-urban societies
and predict impact. However, the optimistic must be heard; I
expect one of the major innovations that will have massive effect
on the cities to involve the movement of ideas--that this movement
will have profound impacts on social attitudes and value, land
attitudes and values and finally will promote a new view
towards work, sex, race, and religion. One very interesting
aspect of this circumstance will be the formal role of the
citizen--his vote, his attitude, his contribution. Involved is
essentially the redefinition of progress. Don't know time of impact.

40% Prob.

Time
Interval

Expertise

COMMENT SHEET:

This space is reserved for comments on number 21, for comments on any of the others, for additional innovations and impacts, for your ideas on how some of the impacts and innovations may contradict one another or reinforce, for your ideas on the study to date: format, ideas introduced, your reactions:

New Innovations and impacts

-----	-----	-----	22.
-----	-----	-----	23.

40% Prob.

TIME
INTERVAL

EXPERTISE

Below are displayed your answers to the multiple choice questions on the future. I apologize for those choices that were vague or not completely inclusive. The footnotes indicate additional comments that you made; these were really appreciated. Where more than one alternative was circled, one half point was recorded for each choice. The numbers in each column therefore represent some kind of weighted total of your estimates of the future. The figures have been normalized.

During the interval you marked for your innovation-impact combination (or for 1985 if you marked "don't know"), do you expect a U.S. economic system that is

a. Prosperous and expanding--basically '60s-style free enterprise

b. Slow growing or stagnant--free enterprise as above

c. Depression starting under free enterprise

d. Prosperous and expanding--strong government controls

e. Unsuccessful government control

f. Non-expanding successful economy

g. Growing base of communes, small industry and business

h. Other

i. Don't know

Comments on a.-none

Comments on b.-when real GNP+pollution effects+inflation taken into account(76-80)

Comments on c.-none

Comments on d.-in '76-80, will begin to stabilize
-in '81-90, yes but not much
-in '91-01, leaning toward almost socialism

Comments on e.-in '91-01, based on succession of massive economic and industrial upheavals and failures

	1976-1980	1981-1990	no estimate of time interval 1991-2001
a. Prosperous and expanding--basically '60s-style free enterprise	.1	.121	0
b. Slow growing or stagnant--free enterprise as above	.15	.090	0
c. Depression starting under free enterprise	.1	.153	0
d. Prosperous and expanding--strong government controls	.4	.363	.2
e. Unsuccessful government control	.1	.153	.3
f. Non-expanding successful economy	.1	.030	.2
g. Growing base of communes, small industry and business	.05	.090	.1
h. Other	0	0	.2
i. Don't know	0	0	0
Comments on a.-none			
Comments on b.-when real GNP+pollution effects+inflation taken into account(76-80)	1	1	1
Comments on c.-none			
Comments on d.-in '76-80, will begin to stabilize -in '81-90, yes but not much -in '91-01, leaning toward almost socialism			
Comments on e.-in '91-01, based on succession of massive economic and industrial upheavals and failures			

For this and the other questions in this series, you were asked in Round 1 to mark the alternative that seemed most likely to you. I suggest that in making your own interpretation of the results of this section, that you notice the spread of results as well as the concentrations.

U.S. Internal Politics

	1976-1980	1981-1990	1991-2001
a. Status quo	.105	0	0
b. Increased federal power	.475	.691	.2
c. Shift of power locus to state/local	.210	.193	.2
d. Single party government	0	0	0
e. Direct democracy, multi-party	.105	.09	0
f. Radically altered by revolution, breakup, or war	0	0	0
g. Other	.105	.077	.6
h. Don't know	0	0	0

Comments on b.	-in '81-90, slightly	1	1	1
	-in '91-01, socialized health care, insurance, nationalized transportation			
	-in '76-80, slightly			
Comments on g.	-in '81-90, ineffective power centers; Italy-France-India-type politics			
	-in '91-01, centralization of control will be more pervasive than ever before but breakup causes a profusion of small relatively spontaneous enterprises to emerge			
	-in '91-01, ineffective power centers			

U.S. Demographic Patterns

	1976-1980	1981-1990	1991-2001
a. Approximately same population distribution as present; on the way to 300 million people by 2001	.313	.321	.4
b. Extreme urbanization	.312	.322	.2
c. Population dispersal, pastoral; total population stable or declining	0	0	0
d. Like "c", but highly integrated	0	0	0
e. Other	.375	.357	.4
f. Don't know	0	0	0
	1	1	1
<p>Comment on a.-in '81-90, shift from a. to b. Comment on b.-in '81-90, pastoral, dispersed outside city Comment on e.-in '76-80, suburbanization -in '76-80, slower growth than last 20 years; continued urbanization slow -like a. but more decentralized in '76-80 -in '81-90, suburbanization -in '81-90, slower growth than now; slow urbanization -in '81-90, like now but more decentralized -in '81-90, dual life styles based on two cycle week of 3 1/2 days each -in '91-01, higher suburbanization but involving greater dispersion made possible by decentralization and accompanying demilitarization</p>			

World Population/Subsistence

	1976-1980	1981-1990	1991-2001
a. Global population growth rate down; starvation rates stable or going down	.353	.321	.2
b. Population rates up; famine held in check by increased food production	.118	.250	.4
c. Population rates up; famines major factor	.235	.179	.1
d. Population crash due to previous overpopulation, famine, pollution, rising price of resources	0	.107	.3
e. Other	.176	0	0
f. Don't know	.118	.143	0
	1	1	1

Comment on a.-in '81-90, will be either a. or b.

Comment on c.-in '81-90, in some parts of the world

Comment on e.-in '76-80, population rates up in western countries, famine and local area wars

(e.g. India-Pakistan) probable

-in '76-80, population rates up, but lack of famines major factor

Internal Violence	1976-1980	1981-1990	1991-2001
a.Sporadic crime	.545	.321	.25
b.Pervasive, apolitical violence	.227	.179	.417
c.Visible, low-level insurgency	.046	.107	.25
d.Covertly supported, low-intensity insurgency	.091	.214	0
e.Higher intensity insurgency	0	.036	0
f.Private armies	0	0	0
g.Other	.091	.072	.083
h.Don't know	0	.071	0

1 1 1

Comment on a.-in 1991-01, minimum crime levels
 -in '91-01, many sporadic acts of violence;
 even apolitical alienation adopts political
 tone.

Comment on b.-in '81-90, not insurgency; India-type riots
 once in a while, continuing into '91-01

Comment on c.-in '81-90, rising then falling off

Comment on g.-in '81-90, pervasive political violence
 -in '91-01,

Personal Concerns	1976-1980	1981-1990	1991-2001

a. Anxiety, individual solutions	.176	.154	.062
b. Anxiety, collective action	.353	.231	.063
c. Achievement-oriented, individual-oriented	0	0	0
d. Achievement-oriented, collective	.176	.115	.125
e. Person-centered unfolding	0	.115	0
f. Other	.059	.077	.375
g. Don't know	.235	.308	.375

Comment on a.-in '76-80, as now

1 1 1

Comment on b.-in '76-80, as now

Comment on e.-I hope ('81-90)

Comment on f.-in '76-80, anxiety frustrated by lack
of solutions (on into '81-90)
-in '91-01, collective-oriented complacency
-in '91-01, alienation that is socially
rooted so that people discover collective
solutions

In Round 1, it was asked "Will the impact of your innovation be heavily dependent on the background future you sketched above?"

Results: yes - 10
no - 16

(the total is larger than the number of returns because of the aggregation of the data)

Breakdown: 76-80 yes=3;no=6
81-90 yes=6;no=7
91-01 yes=1;no=3

In Round 1, it was asked, "Changes in some factors will likely have greater effects on your prediction others. Which of the categories above contains alternatives likely to have the greatest effect on your prediction?"

Results: Economy= $8\frac{1}{2}$; Internal Politics=11; U.S. Demography= $3\frac{1}{2}$
World Population=0; Internal Violence= $1\frac{1}{2}$; Personal=4
Other: particularly women's lib, the need² for greater productivity, poor overworked transportation

III. The group of use interested in cities and the future now is about thirty-five in number, engineers and community organizers, academics and members of city governments, citizens of three nations, some interested in the study and a few coerced.

I propose that there may be some usefulness in a continuing collaboration, a discussion of ideas and policies. The agenda would be up to members of the group. I am willing for the time being to act as a clearinghouse; if there is interest, financing can be found to cover overhead.

Let me suggest how it might possibly be done.

Periodically a letter like this one could be sent out containing an "agenda" of ideas and a roster of comments made by members of the group in the last letter or two. In your reply, you could comment on ideas introduced in the letter or introduce topics or questions of your own.

The following ground rules might be useful:

Anyone may be included on the mailing list at his own request. New members could be solicited at any time.

To get a letter, each letter, you must request it. Such a request would ordinarily consist of returning the previous letter or even just a note. This hopefully will be sufficient motivation to have an active group who respond to your ideas.

In general the conversation out to be limited to topics relevant to cities and futures more than a year or two away; with the time it will take to get comments back and forth, crisis discussions will never really get started. I predict about five "editions" per year based on our existing rates of communication.

Please indicate below if you wish to be included in such a group. If five people do, those five will soon receive the first edition. Please give me your reactions and ideas. Will the thing work for you as a means of communication or of encouraging your own thinking? Might other topics or ground rules work better than the ones I have proposed?

your name

IV. ABOUT YOU

—▶ First off, can I use your name in a listing of participants in this study: yes/no

Second: I would like to get a little information on your attitudes, political and otherwise, for possible later use. I must say that I probably won't be using this immediately; if your time is quite limited and you must cut corners, this is the least important part of the study.

1. On a scale of 1 to 10, where 1 represents no contact or interest and 10 represents full time, rate your professional involvement with urban problems. _____
2. On a scale of 1 to 10, where 1 represents no contact or interest and 10 represents full time, rate your nonprofessional involvement with urban problems. _____
3. Are you, in general and as much as such a question can be answered, optimistic or pessimistic about the future of the cities?
_____. Take as much space as you like to explain why.
4. Would you class yourself as liberal, conservative, moderate, radical left, radical right, or disinterested? _____ (The answers to this question would be used in a correlation of labels with responses in the rest of the questionnaire.)

V. ABOUT STUDIES OF THE URBAN FUTURE

You have now had a chance to think some about future studies and have had your perceptions bent all out of whack by the poor quality of this particular one. What kind of urban-future studies do you think would prove useful to society/special groups/yourself? What suggestions would you make to me/other futurists about to undertake such a study? What kind of information would you like to have from me (if I can get it) about the present state of futures research? (Feel free to scrawl on the back of this sheet or a separate page.

VI. THANK YOU VERY VERY MUCH.

P.S. COMMENTS ON THE FIRST QUESTIONNAIRE

Below you will find a collection of the comments made on the first questionnaire that were not put elsewhere. They were most helpful.

Don't think innovations relatively important in determining future.. trends will have the massive effects..doubt that much else will influence system behavior

emphasis on new ways of doing things leaves out important effects of old ways of doing things

I would like the reaction of a wide group on the proposition that the sole function of government is to transfer external costs and benefits; and that, in such a situation, maximum happiness and satisfaction are automatic consequences (SCE:replies to this and other comments will be relayed to the maker and will, if you have no objection, be printed in my final report on this project.)

don't believe (this type of study) is helpful

with the innovation I suggest(system dynamics) and the analysis behind it, the planner is important as a political beast though his skills (new ones) become important after the transitions and the crisis level become intense

(this study is)helpful as an aid to personal reflection

(near the end of the first questionnaire was a question of which factor area (political;internal economy;demography;violence;etc.) would be important in determining the accuracy of your predictions. this comment was made by a member of the group who answered "other") In circling "other" I have attempted to indicate that particular part of me which is fatalistic--and which expresses my feeling about the flow of events on "a course"....all those items above seen collectively comprise the state and attitude of this planet's dominant conscious life form--in contriving to "converge" we will have to overcome language barriers, social barriers and psychological barriers as a purposeful program to replace the physical barriers we have been so busy with in this colonial period

not clear how variables can be related; what model of change do you have in mind (SCE: only that events and trends in many different areas will determine the future of cities)

general socialism is probably on the way, with individual concerns decreasing. It will be interesting to see how others react to this questionnaire about the future. This might help guide/change/prepare for the future state of the country

it should help me at least!

on violence question: no violence, except individual, is apolitical

this study could be helpful by making me think about the dynamics of the transportation-ekistics complex (SCE: if you want to find out about ekistics, a journal called Ekistics is published by Doxiadis's group and is available in many public libraries and probably all planning libraries.)

I hope this study will help

Innovation will cause growing conflicts between interest groups, with stalemate in the short run and serious "shortages" in the long run (except in the South and Southwest)

Really do not know (if the study will be helpful). Interested in the results.

RESULTS OF THE SECOND QUESTIONNAIRE

Forty-six copies of the second questionnaire were distributed, once again only to people who had agreed in advance to contribute their time. Twenty-four questionnaires were returned. Twenty-nine panelists took part; those who granted permission to have their names listed are:

Louis Alfeld	Brown Miller
Joseph Brenner	Charles L. Miller
Don R. Brown	D. Quinn Mills
Albert G.H. Dietz	Robert Solow
Frank P. Davidson	Lawrence Susskind
William Doebele	Carl Sussman
Selwyn Enzer	Maris Vinovskis
John A. Evans	David C. White
Gary J. Felser	Carrol Wilson
Bernard Frieden	David G. Wilson
Walter McCann	

Results of the returned second questionnaires are aggregated on the following pages in a manner which is intended to be self-explanatory.

SUMMARY OF ANSWERS TO MARGINAL QUESTIONS, SECOND QUESTIONNAIRE

	3 important?	40% probability	Time?	Expertise?	
1.	3	14	5	6	Land use policies, 1981-90
2.	5	7	6	6	System for charging for externalities, 1981-90
3.	2	9	4	6	Meter street, 1976-90
4.	5	11	5	7	Public Ownership of land 1981-90
5.	4	3	5	4	High speed ground transport 1991-2001
6.	5	4	4	4	Interactive TV, 1976-90
7.	2	13	6	5	Advent of supercity, 1991-01
8.	7	7	5	4	Urban core exclusive poor, black, puerto rican 1976-90
9.	1	10	4	4	Small community ownership 1991-2001
10.	4	3	5	3	Wired city 1981-90
11.	5	4	4	4	3 1/2 day week 1981-90
12.	1	4	7	2	New kinds of transport 1991-2001
13.	2	9	4	3	Sophisticated analyses, urban dynamics 1981-90
14.	7	1	1	5	Public interest to environment, community impacts of physical facilities 1976-80
15.	2	7	1	5	Escalating demand on govts. to control urban env. 76-90
16.	0	4	4	7	Increased housing demand, production
17.	3	7	4	3	Replacement of auto by free transit
18.	3	1	3	2	CATV
19.	4	3	4	6	Improvements in decision making
20.	1	3	5	2	3 day work week
21.	2	2	2	1	Movement of ideas

The numbers to the left refer to the number of questionnaires marked for at least one of the indicated innovation/impact combinations. If innovations A and B are combined and, of two questionnaires, column 1 is marked in A and B of one and A of the other, the combined score is 1. One of the innovations was marked once in one of the questionnaires at least.

22.	5	11	8	7	Combine 2 and 3: externality payments
23.	11	5	9	3	Combine 6.10,18: CATV, wired city
24.	5	5	9	4	Combine 5, 12: high speed transport
25.	5	7	9	5	Combine 11,20: short work week
26.	6	9	6	5	Combine 13,19: analysis, decision-making
27.	8	15	9	8	Combine 1,4: land
28.	6	8	10	4	Combine 5.12.17: transport
29.	11	11	7	9	Combine 13.14.15.19: Decisionmaking, analysis, governance

1. Land use policies (tax laws, zoning) which prohibit use of new land for urban purposes. 1981-2001

Number of panelists indicating this innovation as one of the three most important: 3

Number feeling innovation-impact combination did not have at least a 40% probability: 12

Number disagreeing with time interval indicated: 5

Number of panelists indicating expertise: 6

COMMENTS

- important in some ways, will generate apartment construction
- one tool to stop growth
- we presently have land use controls via zoning. This implies a more stringent form of control. I doubt that this will occur.
- Don't believe in prohibition-- just in higher charges. An equitable land-use external-cost-transfer system would have a far-reaching, delightful, revolutionary effect (I have a paper on this topic: David G. Wilson)
- I expect we will have such a national land use policy within the next five years
- Seems much too drastic to be likely. Expansion of urban areas not finished yet.
- Probably create specific things (open areas,...) instead of generally urban growth
- There might be a token policy of preservation of open spaces, etc. However, this will be an exception-- not part of an overall policy of non-urbanization
- What is new land?
- Some exist now for conservation land, parks, etc. I doubt very widespread prohibition of urban use. Impact should be to preserve

and protect natural features.

-Will occur only in highly differentiated (probably on the state-by-state level) and widely varying degrees of implementation. Probably principally in outer peripheries of existing cities. You imply a nationwide system which seems unlikely except in incremental fashion (e.g. land banks)

-Don't agree with prediction. In the USA we are, on the contrary likely to see special arrangements for establishing new towns through 1990. Only a food shortage could reverse our policy of growth.

-Agree except would say "greatly restrict" instead of "prohibit".

-word urban misleading-- population becoming and will continue to become suburban, but highly concentrated.

-Depends on what is meant by prohibiting use-- this already occurs to some degree under present zoning laws. If it is suggested that federal or states government is going to take large amounts of land and place them off-limits, I am a bit pessimistic from a political point of view. Also this will probably have minimal effect in the long run.

-No society I know of has ever completely stopped new urbanization. In U.S. there is no shortage of land to urbanize except in Hawaii and other special situations. As low income groups gain income, they will want their share of suburbia. Vested interests in urban growth so great complete prohibition politically virtually impossible. There is (except in Hawaii and special cases) no compelling physical, economic or social reasons for such an event. [This would occur] In very long future, if ever (see above)

2. A system of charging people for their external costs could come into being e.g. paying for pollution. The innovation which would have the most dramatic effect on the shape of our cities is one which would charge transportation externalities-- which would charge the auto heavily for rush hour in-town driving and reimburse public transportation. New forms of public transportation would arise as a result. 1981-90

Number of panelists indicating this innovation as one of the three most important: 5

Number feeling innovation-impact combination did not have at least a 40% probability: 7

Number disagreeing with time interval indicated: 6

Number of panelists indicating expertise: 6

COMMENTS

-Probably sooner

-yes, where [pollution] locatable. How would this [charge the auto heavily for rush hour in-town driving and reimburse public transportation] be accomplished?

-Good idea + potent. But I doubt its use because cities and suburbs will not be under single political control. Initial redistribution will come through income tax and a transportation fund to be used for both highways and mass transit. Federal level of government will effect the redistribution.

-Already happening by direct & indirect means. Seems obvious trend will continue and expand.

-Public transportation is no panacea: we need improvements (cost, space, pollution) in private transportation -- and dual-mode arrangements.

- also charges to industrial/municipality "polluters (impact: new product lines/industries; need for significant reoccupational training; intensified regional corporation to share/reduce costs)
- Difficult to enforce and collect but we may come to something like it-- i.e. shutting off streets or lanes to traffic. Should encourage more public transportation. #2 and #3 are very close to each other with #2 being more realistic from acceptance point of view. [#3 is concerned with metering use of streets at various hours, in order to charge full social costs].
- Transportation charges relatively easy to apply and will come sooner. Some pollution factors already being charged for. But other types of urban "externalities" are very subtle and an acceptable measurement and charge system will take a long time to be developed and accepted.
- Just a gimmick. Mass or public transportation is likely to expand-- the tax is only one way to pay for it.
- Will come but not in next decade.
- Doubtful this useful
- This argument is circular-- tax people for using private transportation (when mass transp. is inadequate) to raise funds for mass transp. which would then be unable to support itself without the income from the taxes imposed upon users of private transportation.
- Yes. Related to 1 & 3.
- This should be combined with #3-- They are essentially the same.
- Might come about even slightly sooner than 1980. As I recall, it seems likely that such a thing is happening (or being thought of) now in certain areas-- impose high parking rates for commuters, while keeping public transport costs down.
- quite possible, minimal gimmicks such as these might be employed. However, central cities will decline in importance as a work place (with some exceptions). Above all, capitalism cannot make the kind of resources available for effective public transportation systems.

3. Development and acceptance of some simple device for metering the use of city streets at different hours of the day by private cars. One could then charge nearer the full social costs. Effect hardly "massive"; primarily reductions in congestion and travel time, improvement or urban landscape, possible some de-urbanization. 1976-90

Number of panelists indicating this innovation as one of the three most important: 2

Number feeling innovation-impact combination did not have at least a 40% probability: 9

Number disagreeing with time interval indicated: 14

Number of panelists indicating expertise: 6

COMMENTS

-Only one of several concurrent means, and NOT one of most important. Also just as likely that "automobile" will metamorphosize [sic] into smaller, non-polluting vehicle permitting same dense use but less negative impact. This might well occur concurrently into "metering" or could occur as a result of metering or even vice versa. Also, demand-activated, guideway or automated systems may well occur as well.

-As auto ownership spreads further, such measures will meet with increasing, NOT decreasing, resistance.

-Just a gimmick. Mass or public transportation is likely to expand-- the charge is only one way to pay for it.

-Easy nibble.

-Though this [improvement in urban landscape] will probably occur, it will basically maintain present system more than most innovations.

-A variation of #2

-Yes. Effect could be very large

-I doubt the cost of implementing such an approach would ever be worth it.

-This should be combined with #2-- they are essentially the same.

-Perhaps, but impact doesn't seem great enough to bother with it except perhaps for traffic control and emergency monitoring.

-Useless but likely innovation. However, it will not likely have the results projected.

-might accept if the device was described. Do not visualize.

-Don't see who would be charged? and I doubt the development of any system to identify cars electronically.

4. Public ownership of all land in U.S., or at very least, public ownership of all development rights. Impact: planning for urban development and patterns of urban growth; end to land speculation; redistribution of income as public corporations capture the unearned increment in land values due to public and private investment in infrastructure; access of inner city poor to land in suburbs etc.
1981-90

Number of panelists indicating this innovation as one of the three most important: 5

Number feeling innovation-impact combination did not have at least a 40% probability: 11

Number disagreeing with time interval indicated: 5

Number of panelists indicating expertise: 7

COMMENTS

- I can imagine starting this way, but hardly possible to nationalize land now, like unmaking an omelet.
- contingent on massive public awareness of the strong case which could be made vs power of vested interest groups
- Too broadly written
- Much like #1; Public ownership very unlikely.
- not in US.
- Very doubtful if this will occur-- can't imagine political structure doing this. Utopian??
- I view this as quite likely, but only of land critical to urban development process, not "all land."
- Included in 1 above?
- too utopian
- Less likely than 1, although directed toward a similar end condition.
- Obviously I prefer 1 above so long as it included externalities

rather than prohibitions.

-Can't quite see it happening that early, unless something comes up as far as government/private relation. Maybe 1990-2000.

-Private ownership too ingrained.

-Even if true this would scarcely "end" land speculations! It would go to different people, perhaps.

-Politically unfeasible. Instead it is likely that there will be incremental steps toward public ownership or development control of part of land, principally that closest to existing urbanization. Land banks will include only a fraction of all land.

-We will simply enlarge categories of "public interest" justifying condemnation proceedings.

5. High speed intercity ground transport. The main impact will be to stimulate the development of distant suburbs or new towns. '91-'01.

Number of panelists indicating this innovation as one of the three most important: 4

Number feeling innovation-impact combination did not have at least a 40% probability: 3

Number disagreeing with time interval indicated: 25

Number of panelists indicating expertise: 4

COMMENTS

- '80-'90

- Reasonable.

- Note types being developed now (note cross impact of "6" below, reducing need to travel: 'communicate vs commute')

- Good, but it might simply encourage people to commute and travel more unless accompanied by external-cost payment.

- I think this will occur 1975-1985.

- Probably.

- Perhaps 5 years earlier. Don't know whether main impact will be to develop new towns-- it might just suffice as economically viable, convenient, low pollution transportation system.

- Very likely to occur-- esp. as land costs keep rising and we begin to subsidize trans. more.

- We will have some high speed ground transport, but impact of communication technologies far more significant to urban form.

High speed transport mostly slave existing high density areas and urban densities generally declining in US.

- Influence can be both good and bad depending upon regional planning and controls over land use.

- Doubt it; see increasing sophistication in individual and group vehicle design.
- HSGT will just be built along major existing megalopolitan corridors. This will encourage intensive corridor development, including New Towns (both new and accretions around existing nodes). Distant or rural community development will come about through other means-- not HSGT.
- The impacts will also include linear cities (along the rights-of-way)

6. Interactive TV coupled with cable systems. It should provide more and better information and analysis on many issues such that smaller groups can have power access. It may restructure national work habits (if more online computers are available) and national politics. 1976-1990.

Number of panelists indicating this innovation as one of the three most important: 5

Number feeling innovation-impact combination did not have at least a 40% probability: 4

Number disagreeing with time interval indicated: 14

Number of panelists indicating expertise: 4

COMMENTS

- The effects may have been over-forecast if life-style trends continue to favor inter-personal relationships.
- Inevitable. Now occurring in upper corporate echelons, a few test communities, a few libraries. Only barriers are political (eg Nixon, Clay Whitehead, CBS/ABC/NBC) etc.
- Part of #18 [CATV wired city].
- Agree, but doubt if it will be widespread even by 1990-- or ever if #10 is true [wired city network].
- I think 6, 19 and 21 will couple to move massive positive effects for significant attitudinal and value shifts
- Greatly over-rated. Costs will not permit it to give power access to smaller groups. Radio has been here for 40 years and no such impact. Online computers will, of course, affect some work habits.
- May have very profound effect on political decision makers by creating rapid feedback system. Very similar to #'s 10 and 18 though has different cen.

- While this might be likely, it will not have the kind of sweeping effects suggested. Most beneficial and real improvements will be compromised through federal regulation with monopolization.
- Too soon to happen on any large scale (may be 1986 as lower limit). Don't know how many people would want it. Its use for universities, politics, economics, teaching, etc, is clear, but I think that many people would be wary, or not use the system to its capabilities.
- 1976 too soon.
- Yes-- not too significant, but interesting in itself.
- Major possibilities but I haven't thought through all implications.
- Related to 10 and 18. Forecast as coming a decade too soon [note: this was paraphrased from comment sheet dealing with all three questions].

7. Advent of the supercity...mile high, self-contained, mainly self-supporting. Impacts: new lifestyles, probably closer living. People-oriented, machine-assisted i.e. walking with moving sidewalks, etc. Change in movement patterns-- mainly within city. Change of personal property and ideas. Few cars; no reason for great number of styles or personalization of vehicles. Living styles similar as basic size, shape, but many alternatives and options available and creatable, some socialization, with stress on living in groups. 1991-2001.

Number of panelists indicating this innovation as one of the three most important: 2

Number feeling innovation-impact combination did not have at least a 40% probability: 14

Number disagreeing with time interval indicated: 7

Number of panelists indicating expertise: 5

COMMENTS

- highly unlikely in foreseeable time frame
- We should build one NOW, with a Battelle elevator system.
- Important and interesting but seems unlikely.
- I hope we don't go this way. Few people like that much competition from a few million close neighbors.
- Solericity may never happen-- I hope it proves to be as infeasible as it is undesirable.
- A little early for it to occur.
- The social consequences might follow from living in such a supercity but people will not be ready to accept such cities and the engineering won't be available within reasonable costs.
- Disagree with first part-- population should level off and mile-high cities will be refused. Otherwise agree.

-A few-- each taking 25 years. 10^6 + people-- Like French New Towns-- minimum 250,000.

-Certainly would have great effect, but I wonder if other factors would not operate in other direction-- i.e. even more dispersion.

-Will occur in isolated cases. Never be a dominant pattern. Modern technology permits the self-contained city, but more significantly, permits ever increasing varieties of living styles much less authoritarian and congenial to Amer-European values. Supercities, however, may be very important in Asia, where options are much more limited.

-Let's hope not!

-May well be the future of the New York Cities of the world.

-Perhaps sometime-- who knows?-- but this sort of thing on any scale (and it has to be large-scale) requires fantastic capital investment, hardly likely to be forthcoming in next 30 years.

-I think of the major cities (such as Tokyo, London, Paris, Moscow), NYC is the only one planning an increased ("mile high") concentration of numbers of people (i.e. greater density) and it is/will be hardly self contained/self supporting.

-Cannot achieve environmental variety demanded by increasingly sophisticated and affluent [sic] society.

-WILL NOT HAPPEN. Question is too narrow, hinging entirely on mile-high cities. If one were looking for esoteric new forms of cities, built-on-water, underwater, and space cities would seem more likely candidates.

8. Urban core will become exclusively poor and black or puerto rican.
Complete decline of stable neighborhood as basis for urban politics.
Decline of service function of government. City location for economic activity (marginal interest in "community", local politics) and temporary residence for migrating poor. 1976-1990.

Number of panelists indicating this innovation as one of the three most important: 7

Number feeling innovation-impact combination did not have at least a 40% probability: 7

Number disagreeing with time interval indicated: 5

Number of panelists indicating expertise: 4

COMMENTS

-This is true now. The real trick is to speculate what will come next, not address by this very short range projection

-Indications from census bureau are of increasing suburbanization-- even of blacks and puerto ricans.

-This trend is here now (Detroit, Cleveland), obvious opponent to Fed/State gov'ts. I believe that strong judicial (e.g. California, Texas, Richmond, education decision re: validity of property tax) action will slow or turn back this trend...yet suburban "backlash" to urban/suburban concentration could be severe. The most likely result will probably be success in some cities (hopefully Boston for instance) and failure in others.

-Believe that the salvation of the country is in turning control of cities over to neighborhoods.

-Barely possible, but I think unlikely. Likely to be arrested for economic reasons at least.

-Afraid this can happen unless #13 finds a way out [sophisticated analyses and improvements in decision making-- also #19].

- The corporate city will-- together with U.S. gov't move to change this trend, probably within 10 years.
- Hopefully, this decline in the city would be followed by period of active change, growth and development.
- In some cities only. In others the opposite.
- The [sic] won't happen. The existing interest in urban infrastructure is too great to be abandoned. Jobs are increasing in central cities.
- May happen if we don't change land-use, taxation, and welfare policies. 'Externality' legislation could redirect us.
- Not sure about this part [Decline of service function of government].
- As incomes rise, social admixture will also. Long-run, this is a non-problem.
- Can agree only to a considerable degree less than you state the case. E.g. some city cores are, will, will continue to become, as you describe "exclusively poor, black or puerto rican." Those cores will become more so. A counter-trend will meanwhile set in of some-- if not great-- significance. Poor will share to limited degree in scatteration. Income policy could substantially alter this trend.
- It isn't now and it won't be (I don't believe) in 76-90.

9. Small scale community ownership and control of the means of production, development, etc. 1991-2001.

Number of panelists indicating this innovation as one of the three most important: 1

Number feeling innovation-impact combination did not have at least 40% probability: 11

Number disagreeing with time interval indicated: 4

Number of panelists indicating expertise: 4

COMMENTS

-Indicators everywhere-- in industrial companies, co-ops, towns, communes-- seem to suggest this will become greatly more generalized than it now is. Cambridge Institute New City Project proposes this on city-wide level.

-no tendency in this direction

-unlikely

-Why 'community'? Maybe community regulation, which would beneficially come about with 'externality' legislation.

-not likely

-Of all production, dev't? Seems a bit optimistic, for community as defined now, but by then, the community would have changed, and could conceivably be able to do so.

-This will be more common although not the rule.

-Highly unlikely

-Not really likely.

-Society unlikely to give up the productivity advantages of large-scale production.

-when are the CDC/black capitalism successes which can be extended?

-Some-- right direction

-Sure to some degree, but not likely to have major impact-- very similar problems to farmer coops in 19th and 20th century.

-Every present trend is against this even in service sectors, to say nothing of primary and secondary sectors. The key is not in production but organization of community based and less wasteful systems of consumption.

-1976-2001. Small in scale, great in implication.

10. ...the wired city, a communications network which will be advertised as making the public better educated and informed but in reality will be used to purvey pabulum. Access to the communications system will be restricted to those licensed by the leaders of the system. The communications network will be video-phones, cable TV in all homes and places of business, computer controlled data nets on people and events, and electronic surveillance mechanisms already in use and undergoing refinement. Such a communications network will be essential to program the populace in the much enlarged urban-suburban world. 1981-90.

Number of panelists indicating this innovation as one of the three most important: 4

Number feeling innovation-impact combination did not have at least 40% probability: 3

Number disagreeing with time interval indicated: 5

Number of panelists indicating expertise: 3

COMMENTS

-1991-01

-I believe this is unlikely. Trust is already strained. This would kill trust and result in real revolution.

-Big Brother fear-- legitimate concern and will occur in some degree, but overestimates its effectiveness (allowed)-- we will probably see more access of public to media-- not less.

-Doubtful

-This seems very likely to me and clearly one of the greatest challenges to the creator of a humane and democratic civilization.

-Note cross impact/overlap with #6. I "predict" a mixed bag! Like TV is today. Greater pluralism/participatory democracy vs usurpation of a greater degree of power (one way down and out broadcasting) by the establishment.

-Several cities are already well on the way to this. I think that after the development of several such areas, there will be a counter-"revolution" among some of the residents/guests who were not getting real benefits from the gadgetry.

-Likely, but not very important.

-Why so cynical!

-Ugh

-Perhaps estimated as coming more rapidly than I foresee by at least a decade. Related to 6 and 18. [Viewed as single development.]

-Wired city and wired nation are 100% certainty. Some-- not all, and I would argue, perhaps increasingly less-- of the fare will be pabulum. Don't know what you mean by "program the p pulace". "100%" means the wired system, not all the qualifications you put on it.

-part of #18

-This is a real danger.

11. 3 1/2 day work week (or less): 1) people play multiple work roles-- largely in service sectors. Many new services developed as yet unimagined. 1981-90.

Number of panelists indicating this innovation as one of the three most important: 5

Number feeling innovation-impact combination did not have at least 40% probability: 4

Number disagreeing with time interval indicated: 5

Number of panelists indicating expertise: 5

COMMENTS

-Crucial factor-- will change patterns of life and encourage new behavior almost identical to #20. [3 day work week]

-4 day week possibly.

-Someday, but not by 1990. Hours of work for full-time workers have actually stopped falling in past 10 years, and this appears to reflect actual desires of workers.

-This is all to the good IF a catch-all national service scheme exists for the unemployed.

-4-day week presently becoming quite common. Multiple roles also. Whereas many people will accord into scenario sketched, undoubtedly many others will work even longer weeks. That is, it will be a mixed bag.

-Not sure about multiple work roles in service sector. Probably increase leisure more.

-See #20.

-Seems highly probable.

-by 2000 or later

- This is a myth for the "knowledge worker (managers, professional) in the "postindustrial society which is here now. His days are getting longer and job more likely to become obsolete. Factory workers. Yes! But there will be not much growth in US in this area.
- This will have enormous impact on urban form (1) some will commute huge distances (2) others will use time to enrich certain urban places-- as we now see in Harvard Square

12. New kinds of transport-- separation of people and vehicles. 1991-2001.

Number of panelists indicating this innovation as one of the three most important: 1

Number feeling innovation-impact combination did not have at least 40% probability: 4

Number disagreeing with time interval indicated: 7

Number of panelists indicating expertise: 2

COMMENTS

-?

-to [sic] soon

-1970-- already exists

-Yes. People will be in vehicles, though.

-Unclear

-Already happening. Separation is a virtual planning dogma-- however unevenly applied. New transport means in advanced stages g [?] prototypical development.

-Don't understand

-? Grade-separated...or by mode-- or what? HOW CAN YOU SEPARATE PEOPLE FROM VEHICLES AND STILL HAVE NON-PEDESTRIAN MOVEMENT!?

-If there is "separation of people and vehicles" I suppose this means multi-level cities: O.K.

-This kind of thing will happen as often as Central Parks are created-- such systems will be the exception.

-Maybe 1985.

-Vague

-Probably.

-Instead I see new kinds of vehicles better able to operate in present "pedestrian" areas.

-Too vague.

-Yes

13. Sophisticated analyses, specifically urban dynamics, and world dynamics. If it takes hold, there can be rather profound changes in political, economic and social controls. 1981-90.

Number of panelists indicating this innovation as one of the three most important: 2

Number feeling innovation-impact combination did not have at least 40% probability: 9

Number disagreeing with time interval indicated: 4

Number of panelists indicating expertise: 3

COMMENTS

- Will have major impact, but also implies that political structure will adapt as rapidly. On the latter I am more doubtful
- Pressure will be for more participatory, explicit techniques, and for a great variety of techniques.
- Not that important.
- Don't believe in them.
- There can be changes, but more than the analyses, which undoubtedly will become sophisticated (and accurate), someone has to utilize them. The convincing of use of the analyses is the difficult task.
- True. However these are tools of manipulation and not tools of analysis as their users would like people to believe.
- Yes, and we need "profound changes"
- Unlikely
- Sorta my thing @ no. 21. said in a better briefer way!
- These are valuable tools, but enormously difficult to apply to policy as 20 years of experience with earlier urban models has shown. Impact will be incremental (better understanding, etc) not revolutionary.

-Already having policy impact, nationally and internationally. "If it takes hold" one would look for changes probably only on national level in post-industrialized nations at first, leading to probable magnification of 1st world-3rd world polarization.

-Same as #19, essentially [an improvement in decision making].

-Yes-- we need them, especially for legislators.

-This is crazy. Analysis has little to do with control.

-It will make small changes not profound ones.

-This [taking hold of the analyses] is a "sales job" I will not address. Urban/world dynamics as an educational/training/planning tool has tremendous potential; as an operational control tool I seriously doubt its value.

14. Public interest and group involvement in environmental and community impacts of building new physical facilities (all kinds: transportation, utility, housing, etc.) in the city. 1976-1980.

Number of panelists indicating this innovation as one of the three most important: 7

Number feeling innovation-impact combination did not have at least 40% probability: 1

Number disagreeing with time interval indicated: 1

Number of panelists indicating expertise: 5

COMMENTS

-very definitely growing

-Yes

-Probably not on a totally generalized basis. Eg. will happen in some places, probably a minority of places. Competing interests in non-physical subjects will be greater.

-Decision-making may become more democratized as excluded groups seek power, but no indications that public participation in non "crisis" issues is a lasting phenomenon.

-Same as #19 [improvement in decision making in social areas]. Sorta the same as 15 [increased reliance on city governments].

-The "public interest law firm" etc. badly needed.

-Its [sic] happening.

-Not clear.

-Not only involvement in "impacts" but involvement in planning, design and management processes.

-Minimal-- if meant by "people"-- much more important if meant by gov't agencies-- hard to know what this ques. means.

15. Escalating demand on city governments to create and control viable physico-social environments; corresponding growth in power of city governments (and federal and state governments which can only act through them); increased reliance on city governments, with or without increased trust in them. 1976-90.

Number of panelists indicating this innovation as one of the three most important: 2

Number feeling innovation-impact combination did not have at least 40% probability: 7

Number disagreeing with time interval indicated: 1

Number of panelists indicating expertise: 5

COMMENTS

-Key political leverage on urban development will be state and federal, but more of details on specific "physico-social" environments at project scale may be delegated to sub city groupings. Either way the city as we know it is losing, with some of its functions moving up to state and federal govts and others moving down to neighborhood groups, etc. Also, race question and recent Court decisions give strong push to metropolitan governmental forms, which will be largely coordinative.

-I suspect new regional scales of government and strengthening of state governments.

-Unlikely-- more city reliance on federals

-Drift seems to be the other way.

-Will occur-- but there may be much closer contact of gov't with people through new systems and therefore may be more trust.

-I don't think this is clear. The "mix" is confusing. We will have greater federal direction and control, but administrative decentralization.

-I note a "trend" of major city runners of world (NYC, Tokyo, London, Paris, Moscow) and other US large cities to want to exchange views and try to exert political pressure as a block on state/federal govts but the financial power of US govt on cities is growing due to income tax. new/different state structure/ could redress this.

-pressure will deal to larger units-- regional and smaller-- neighborhood

-Many city governments will be based upon even smaller groups, which will be trusted, hopefully.

-The force of centralization is too strong. This dynamic is not so easily moved.

-Quality is the question.

-Would guess that increased power would be hedged by growth of unions and corporate sector power, i.e., votes and money.

-Maybe. Again, externality legislation would change this direction.

-A toss-up between city and state gov'ts. Probably both will grow in power. Due to metropolitan, regional integrative needs, state will probably retain principal power.

16. Increase in demand for housing and in housing production. Impact will be to accelerate growth and spread of suburbs, as well as racial and economic integration of older suburbs. 1976-90.

Number of panelists indicating this innovation as one of the three most important: 0

Number feeling innovation-impact combination did not have at least 40% probability: 4

Number disagreeing with time interval indicated: 4

Number of panelists indicating expertise: 7

COMMENTS

-Impact will also be to accelerate orderly, state-coordinated growth which can take other forms as well as the one form you describe (growth poles, new communities, etc.). Integration will occur.

-Yes

-We need more durable, better-quality housing.

-Don't know about the spread of suburbs-growth, definitely, but there are other alternatives, and with a probable change in peoples desire for the seclusion of the suburb in the larger spaces of the suburb, this might change somewhat.

-I guess so?

-We've got the demand-- but the integration is not very likely in the next 30 years.

-Very likely to happen. Goes hand in hand with #5 to some degree.

-Yes

-1971-81

-Housing crisis less acute than depicted. The breakdown of social order and neighborhood decay are the central problems, not hous. production per se.

17. Replacement of the auto by good "free" public transport.-- Cleaner, less noisy cities with more even temper in the traveller. 81-90.

Number of panelists indicating this innovation as one of the three most important: 3

Number feeling innovation-impact combination did not have at least 40% probability: 7

Number disagreeing with time interval indicated: 4

Number of panelists indicating expertise: 3

COMMENTS

-Some of this will happen, but it will have a marginal effect on the real issues of the future.

-I don't care for the words "replacement" and "free".

-Hope so.

-Perhaps combine with 2 and 3.

-All trends point in other direction-- certainly not total or near total replacement.

-Don't think it will ever happen [free transport].

-In core city area?

-Doubtful-- until full [rest illegible].

-See #2/

-Diminishing privacy does NOT improve the quality of life. We need more and better private transport with compatibility with public arteries.

-I'll bet that won't change much.

-Together with high-speed travel to outlying regions, this can profoundly affect city development.

-For very large cities.

-Might happen despite the many experiments that have demonstrated that free transporation is not sufficiently attractive in the fall of subsidies (hidden) to private transportation.

18. CATV-- "wired city". Impact: *revise health education civic services; *potential for increased citizen participation in public decision-making; *revise business-transportation patterns. 1976-80.

Number of panelists indicating this innovation as one of the three most important: 3

Number feeling innovation-impact combination did not have at least 40% probability: 1

Number disagreeing with time interval indicated: 3

Number of panelists indicating expertise: 2

COMMENTS

- Some will happen, with marginal effects.
- Related to 6 and 10. [treated as one development].
- Communications INCREASE the demand for transport and vice versa.
- Not a question.
- Yes-- seems likely and largely beneficial.
- Increased citizen participation in public decision-making is a great unknown, although it seems certain. Its effect will be another thing; and one could draw many scenarios-- apathy, over-participation leading to majority tryrrany [sic], fantastic democratic success, manipulative demagoguery, etc.
- THE most important possible future which should be made more probable.
Note cross/impacts/overlap with #6, #10, #14.
- Same as #10.
- Very likely-- I agree with this interpretation much more than #10-- very similar to #6.
- Why not group all these (like 6, 10, 18) together?
- Nice
- 1991-01 for diffusion

19. An improvement in decision making in complex social areas including cities using systems dynamics as improvement to present decision structure. 1976-80.

Number of panelists indicating this innovation as one of the three most important: 4

Number feeling innovation-impact combination did not have at least 40% probability: 3

Number disagreeing with time interval indicated: 14

Number of panelists indicating expertise: 6

COMMENTS

-Subject to eliminating part in brackets [respondee bracketed from 'using systems'... to ...structure'], I think it is important. Area I claim expertise is only in urban physical planning and design. Also use of man-machine systems to control existing and potential large systems.

-I hope so.

-See 13. I see only marginal improvements coming.

-Will improve, but how much-- political agencies are slow to streamline.

-Same as #13.

-[System dynamics is] one of many tools which when used in conjunction with "wired city"/CATV for specific decision of use to certain groups will prove reliable.

-Systems dynamics is ONE form of analysis. Obviously there will be an ubiquitous increase of this type of too in many hybrid forms.

"Systems dynamics" as such is not going to be a be-all to all men.

-Yes. Hope so.

-It will not improve the decisions. It will be a different rationalization process but the same decision-making process.

- Changes in VALUES are needed if policies are to be changed to meet requirements of better models.
- Techniques will improve but the question is whether social and bureaucratic structures will use new techniques and improved information. Wouldn't guess much impact in less than a decade.
- (See #13)
- Incremental, not revolutionary. Some will happen, but with marginal effect.

20. Widespread use of a three day work week! 1976-90.

Number of panelists indicating this innovation as one of the three most important: 1

Number feeling innovation-impact combination did not have at least 40% probability: 3

Number disagreeing with time interval indicated: 5

Number of panelists indicating expertise: 2

COMMENTS

-Not before 1980-85.

-4 day

-Same as 11.

-See 11. I believe we'll have to regard the giving of employment at some levels and in some areas as warranting public payment (to the employer) in lieu of welfare to the recipient.

-Less than widespread. It will be in "frequent" or "common" use for some sectors of the population, eg. a minority phenomenon.

-Bull....! See comments to #11 [in actuality work week getting longer for many workers-- desired]. Major beneficiaries of this trend will be factory/production workers and people on welfare.

-Same as #11.

-Same as #11?

-See 11.

-Too early.

-1986-96.

-Same as #11.

-Some will happen, but it will have a marginal effect on the real issues of the future. A major factor-- look at U.S. and Europe, change in life styles 1945-1970 due to increased material productivity-- the pre-World War II world is hardly recognizable. 1970 may be equally so in 2000 if these trends continue.

-Very nearly same as #11

-Not for managers or artists or scientists-- only for routine jobs.

-Most likely in large unionized industries.

21. I looked up the word "innovation" and things like "idea", "method", "change" and "novelty" popped up-- somehow I must express that side of me that feels rather than thinks in attempting to look ahead three decades. In this vein I could say "massive effect" is tied into the thermo-nuclear capabilities of techni-urban societies and predict impact. However, the optimistic must be heard; I expect one of the major innovations that will have massive effect on the cities to involve the movement of ideas-- that this movement will have profound impacts on social attitudes and value, land attitudes and values and finally will promote a new view towards work, sex, race, and religion. One very interesting aspect of this circumstance will be the formal role of the citizen-- his vote, his attitude, his contribution. Involved is essentially the redefinition of progress. Don't know time of impact.

Number of panelists indicating this innovation as one of the three most important: 2

Number feeling innovation-impact combination did not have at least 40% probability: 2

Number disagreeing with time interval indicated: 2

Number of panelists indicating expertise: 1

COMMENTS

-Too vague to comment upon.

-Amen!

-What is all this?

-Very good; I agree see #18

-Now happening, beginning of an historical cycle analogous to Renaissance or industrial revolution, but more powerful. Breakdown of nationalism-- new nationalism.

APPENDIX II

A TELECOMMUNICATIONS TECHNOLOGY FORECAST

by James T. Martin, Future Development in
Telecommunications (Englewood Cliffs, N.J.:
Prentice-Hall, Inc., 1971) pp. 344-357.

NOT SO MUCH A FORECAST AS A STATEMENT OF POTENTIAL

Early 1970's

Cable TV spreads rapidly. Cables capable of carrying 40 to 60 channels are installed in many areas. Cable TV companies increase their own production of local TV programs. Cable TV is extensively used for educational television and quality commercial-free movie reruns.

The TV cable is used experimentally for services other than television, including hi-fi music distribution, computer-assisted instruction in the home, and use of the television set as an interactive terminal capable of digital use or of displaying color images.

In North America, Picturephone is marketed extensively to business. Picturephone switching is available initially only in a few major cities but is rapidly spreading to other cities. A few affluent homes have Picturephone sets.

There are isolated uses of the Picturephone links for very high speed data transmission.

The marketing of machines for playing movies in cargridges over television sets begins and grows rapidly. The Columbia Broadcasting System's EVR (electronic video recording) on film is the first, but is soon challenged by alternative (compatible) systems.

Touchtone telephones are installed extensively throughout North America. Only sets with 12 keys are installed.

Telephone voice answerback by computers spreads rapidly. A wide variety of terminals employing voice answerback are marketed. There is general recognition of its usefulness in creating an effective man-machine interface, especially in applications where data are being entered by the terminal user as in factory data collection and sales-order entry systems.

Use of the Touchtone telephone as a computer terminal spreads, for diverse applications. A variety of devices are marketed to connect to the telephone for this system, including additional keyboards, cheap strip printers, a terminal identification device for security purposes, and an attachment for displaying responses on the screen of a domestic TV set. "Voice-print" recognition is used on an experimental basis on some systems for identifying a terminal user. Credit cards with coded, machine-readable, magnetic strips come into use.

Switched data networks are installed, initially serving only certain cities but then spreading rapidly. Different types of systems are used in different countries, which makes the international marketing of terminals and communications software more difficult.

Broadband data transmission over public, private switched, and leased point-to-point lines becomes widely used.

Computerized telephone exchanges, such as ESS 1 and 2, are installed at a rapid rate. Computerized private branch exchanges are also installed in large companies.

Facsimile mail and document transmission increases in popularity and drops in cost. Conventional mail delivery in cities such as New York increases in unreliability. It becomes clear that facsimile gives the only way to deliver mail rapidly and hence a large market grows.

The Bell System installs many miles of helical waveguide transmission systems, each capable of carrying more than 230 thousand telephone calls simultaneously. As yet there are limited locations that have sufficient traffic volume to justify installing this.

PCM links are widely installed and terminals for transmitting data over them come into use. Time-division multiplexing of the PCM links provide many data channels. The maturing of "large-scale integration" circuit technology gives rise to many equipment designs using digital transmission.

Much larger satellites are launched into synchronous orbit. These satellites have much greater power and capacity than Intelsat III (the generation of satellites at the time of writing). Less expensive and more numerous earth stations are used. Most underdeveloped nations now have worldwide links via satellite.

Cable TV systems begin to use satellites for distribution of their programs.

Educational television is transmitted directly to village antennas in India from a NASA satellite, and it becomes clear that this step can have a major impact on the education of the underdeveloped world.

Satellites for domestic use are launched on a pilot basis in the United States. They are used both for direct television broadcasting to community antennas and for common-carrier system trunking of all types of signals.

Late 1970's

Picturephone service, at a substantially reduced rate, is now available on a public dial-up basis in many urban locations. An increasing number of affluent homes are installing Picturephone sets. In cities offering the service most major offices have at least one Picturephone set. Many have a picturephone room with facilities that any authorized employee can use. Some have a picturephone conference room with sets capable of switching transmission between the faces of different conferees. In addition, many executives have a Picturephone set on their desk. The dial-up Picturphone lines are used for very high-speed data transmission.

By 1980 3% of all business telephone sets are Picturephone and 1% of all domestic sets (AT & T forecast). In certain high-income urban and suburban areas, the majority of homes have Picturephone service, which

has become a necessary status symbol. Telephone callers receiving no picture say, "Goodness, aren't you on Picturephone yet?"

Video-conferencing facilities using television links rather than Picturephone grow in usage. Television gives higher-quality pictures and can display documents so that they are readable. Most countries outside North America have not started a Picturephone service but give much publicity to their few video-conference links. Video-conferencing rooms, giving very attractive facilities with voice-actuated camera switching, are installed in many major cities. Large corporations use their own video-conferencing facilities with leased television links. In some cases, executives can participate in the conferences without leaving their office.

Cable TV continues its rapid growth until more than 65% of American homes have this facility. In spite of the name, many segments of these TV links are by radio rather than cable. In the cities, low-power microwave radio is used to feed the cable, often taking the signal to the tops of apartment blocks. In the country, some local transmitters are fed by the cable, and these take the signal to remote homesteads.

Much television becomes "local" in its programming rather than national or regional. On the other hand, much of it becomes international because of the increasing capacity for satellite distribution and the desire to fill up more of the many channels on the cable. England's BBC sends many of its intelligently produced studio programs abroad. When the British television channels close down about midnight, the evening's programs are transmitted to America, where it is then prime time; and when America goes to bed, *its* programs are transmitted to Japan and Australia.

High-fidelity music is piped into the home on a request basis in cities having enough subscribers to make a "music library" service profitable. Cable TV channels are used for this purpose. In some areas, live performances, as well as the music library tapes, are piped into the home.

Wall screens, 5 foot and larger, without cathode-ray tubes, are much demonstrated. A high-fidelity television service using the big screens is planned. Many authorities advocate that it be confined to cable TV rather than to broadcasting because it would consume a very high bandwidth. There are now many new demands other than television for the VHF and UHF frequencies.

Cartridge movies become a mass market. The machines for playing them are used extensively in industry and schools as well as in the home. Cartridges with still frames are used, along with many microfilm devices, for providing manuals and training courses. Movie libraries and rental services are used by the consumer market but not as extensively as was hoped. It is thought that "piped" movies into the home may have a deeper market penetration.

Domestic satellites become a basic part of the North American common-carrier networks. A second type of satellite can distribute television to antennas small enough to be installed on rooftops. These are generally used as community antennas, but some are installed in individual homes, especially in isolated areas.

The number of satellites broadcasting to the lesser-developed nations increases. The cost of appropriate television sets and antennas has dropped substantially. The sets are used for education, entertainment, and propaganda. Although television in the United States continues to focus on entertainment programs, because advertising revenue supported it, television in the poorer nations often does not, for it is largely under governmental control. There is little or no advertising revenue, and thus the entertainment programs are broadcast mainly to lure viewers into watching the education of propaganda broadcasts. The satellites used are American and Russian, and many thousands of villages in India, the Middle East, Africa, Asia, and South America are seeing television for the first time.

The Touchtone telephone keyboard with 12 keys is almost universally available in North America. Eventually the Bell System's production of rotary-dial telephone ceases.

Data processing continues its prodigious growth. Computers have dropped in cost greatly, and with the "fifth generation" they promise to invade almost every aspect of life. In spite of the proliferation of mini-computers, the fastest-growing area of data processing is still that of communication-based systems. Conversely, the fastest-growing area of telecommunications is still data transmission. With the spread of terminally displaying pictorial images and with real-time inter-communication between computers, data processing promises to consume enormous quantities of bandwidth if it can be made available cheaply enough.

Dial-up data networks offering a wide range of bandwidths spread in many countries, and are profitable. Their incompatibility problems have to be solved with interface computers. The tariffs in the United States make the cost of data transmission independent of distance, other than for short distances. This factor has had a major effect on the organization of data processing in nationwide corporations, which, in turn, has an effect on management structure. A corporation commonly maintains one nationwide data bank for almost all kinds of functions--rather than regional or local files.

After a long legal battle, "foreign attachments" are permitted on Picturephone lines through a rigorously designed Bell System interface. A wide proliferation of devices making use of the high dial-up bandwidth come on the market. These devices include color picture sets, video-recording equipment, and high-fidelity sets using signal processing to encode only *changes* in the image and using 10 or 30 frames per second with techniques to eliminate flicker. There are devices for the remote reproduction of engineering drawings, often from a master stored on microfilm or in digital form in computer files. A variety of facsimile equipment, remote Xerographic, and photoreproduction equipment exists. A host of computer peripherals use the Picturephone lines.

Digital transmission is now accepted as the way of life for the telephone companies for both long- and short-haul trunks. New telephone,

Picturephone, and television trunks are all digital. Bit rates recommended by CCITT become standard and typical are those of the T1, T2, and higher carriers.

There is now extensive use of computer-assisted instruction. A minority of the programs used are exceedingly effective. These programs gain prominence, and the vast mass of ineffective programs are largely forgotten. The style and technique for developing good teaching programs become understood.

Many high-IQ families in North America have some form of computer terminal in the home, often employing the keyboard of their telephone and the screen of their television set. Teaching children becomes one of the major motivations for home terminals.

An increasing amount of white-collar work is done in the home through the use of terminals, and sometimes, Picturephone sets, particularly in the case of businessmen, programmers, persons writing computer-teaching material, and those who develop the vast amount of material needed in the numerous data banks. Some software firms chiefly employ married women working from the home. Typing services and text editing services also operate from the home via a typewriterlike terminal connected to a central computer and its files.

Crime increases appallingly. Many homes and offices have a burglar detection apparatus connected to the telephone lines so that the police computers are notified automatically of any intruder. Radar techniques are being experimented with for computer identification of intruders. Pedestrians begin to carry radio alarms for calling for police help.

Privacy and security of information in computer data banks become a major concern but not before the occurrence of many serious scandals and crimes. Substantial development expenditure makes it possible to maintain very high security of data transmitted and stored. New laws are passed in some states relating to the use and control of personal data

stored in computer systems.¹

The first serious attempts at radio spectrum engineering have made possible a greatly increased use of car radiotelephones. Many vehicles are now equipped with a Touchtone keyboard. However, many more measures are needed in spectrum engineering to meet the ever-growing demand. Political pressures are clearly preventing an optimal use of the radio spectrum.

Early 1980's

The cost of long-distance calls has dropped still further, and now the the cost of international calls has fallen dramatically. Many parts of the world can be telephoned from New York at only slightly higher cost than telephoning Chicago. The satellite links are used to handle data, facsimile, and television with equal facility. This fact, together with supersonic travel and the worldwide spread of American hotel chains, makes the planet seem much smaller.

The drop in cost of long-distance transmission in the United States had a major effect on the organization of national corporations and their information processing. Now the same effect is being felt on international corporations. Data banks of international corporate data are used by large firms in the United States, Europe, and Japan. As in the military establishemt a decade before, decisions in the field could be instantly flashed back to centralized command posts. Factories are sited where labor costs are low. Laboratories and programming centers are set up where talent is plentiful and cheap. Administrative offices are located in countries with favorable tax laws. All are linked with

¹See James Martin and Adrian Norman, *The Computerized Society* (Englewood Cliffs, N.J.: Prentice-Hall, 1970), Chap. 24.

leased lines, and now data dial-up costs are becoming favorable because of international data networks.

Data banks with 10^{14} bits of directly accessible storage are fairly common. Such storage is used for photographs, drawings, and documents in image forms, as well as for digital data. Some data banks store randomly accessible film sequences. Much telecommunication usage is for access to the numerous data banks.

The "war room" in business is now conventional. It takes many forms and is given many different names. Often it is the showpiece of a firm's data processing. Few offices of top management are complete without their video link to the firm's information center. There is now (after some bitter failures) a general recognition element. Experienced and highly professional staffs operate with an array of terminals and wall screens that often rivals a NASA Mission Control Center in appearance. Although some managers like to demonstrate their prowess at operating their own terminal, many have an assistant for this task, or else they use their video link to a local information room, which in turn may route some questions on to a remote or central information room.

A major change is occurring in the way financial payments are made in the United States. Cash transfers take place *within* the electronic systems. "Electronic fund transfers" take place within one computer, or between two different computers, holding the accounts of the persons concerned. They are sometimes initiated by "preauthorization"-- that is, instructions in advance of the payment being given to the bank's computer for the routine payment of salary, rents, dues, etc. They are sometimes initiated by the use of an electronic fund transfer card-- a development of the credit card that contains machine-readable details about the holder and which is inserted into an on-line terminal in stores, restaurants, and offices. The cost per transaction is substantially lower than with checks or credit cards. There is no longer any talk of a "checkless" society. The number of checks in use has risen to 50 billion per year and bankers desperately hope that electronic fund transfer will lessen the

deluge of check processing. The EFT terminals have done much to prevent the high level of crime that became associated with credit cards.

Telecommunications is being extensively used in medicine. Information from all manner of patient instrumentation is transmitted to specialists or computers. "Pre-diagnosis" interviews are carried out between patient and distant computer, often to determine whether the patient should see a doctor or not, visit a hospital. Automatic monitoring of chronically sick patients is done by computer, sometimes with the automatic administering of drugs. Sometimes patients are monitored during normal daily activities by means of miniature instrumentation connected to radio transmitters (as with the astronauts). In some cases their readings are recorded by a tiny machine that they can later link to the telephone and transmit the readings to the hospital computer. Remote diagnostic studios are used with powerful television lenses. With the help of a nurse in the studio, a distant doctor or specialist can examine a patient as though the patient were in his office. The patient can see him and talk to him. The doctor can fill the whole of his color screen with the pupil of the patient's eye, or tongue or skin rash. He can listen to a distant stethoscope and can see both instrument readings and computer analyses of them.

The Picturephone tariffs drop further in cost; the service spreads rapidly, with business becoming increasingly dependent on it. It offers many peripheral services in the home and is now regarded by some as a necessity rather than a luxury or status symbol. Air and other forms of transportation become steadily more congested and unpleasant throughout the 1970s, and new efforts to reverse this trend are barely succeeding.

Computer voice input systems that permit a user to speak to a computer over the telephone, using a very limited vocabulary of clearly separated words, are marketed. The computer responds with spoken voice words.

The first public laser channel for common-carrier operation comes into service, giving a digital channel capable of carrying several hundred

thousand telephone calls. A small flexible laser cable using highly refined fiber optics, comes into use. Its bandwidth is lower than the common carrier laser transmission systems but is an ideal replacement for the TV coaxial cable in the home. It provides a cable into the home that could carry 500 wall-screen channels.

A "high-fidelity" television service is started with a large number of lines to the screen. Five-foot wall screens are marketed and the sets operate in a digital fashion. The digital bit stream using a form of differential modulation reaches the home over a coaxial cable with frequent digital repeaters. It is not planned to transmit high-fidelity television over VHF or UHF radio.

Schemes employing millimeter-wave radio frequencies for signal distribution come into public use in some cities. The repeaters are spaced at frequent intervals down the streets or on the city rooftops. A very high channel capacity with a low level of noise and distortion is made possible. The highly directed beams eliminate interference between different transmitters, and it is clear that a large number of such systems using the same frequency bands will be employed in a city. Infrared and optical transmission are used extensively between rooftops, especially for the transmission of data. Satellite systems using millimeter wave frequencies are employed with great success. High frequencies appear essential because of the congestion in the microwave band.

Late 1980's

People, at least in North America, are becoming accustomed to a society in which many functions of life are carried out by telecommunications. Numerous persons now work at home at least part of the time. Tax deductions for home facilities needed for work are standard and include computer terminals, Picturephones, and video-conference screens. Many firms install these devices at their own expense in the homes of employed persons who need them. Many homes are now built with a childproof,

wifeproof office. America's traditional antipathy to soundproofing diminishes.

There are now many millions of fairly inexpensive electronic fund transfer terminals in use. Some persons have one in their home.

A new generation (of people) is now dominant which can communicate with the computers with ease over the various transmission links. Programming is taught at an early age in schools, and most well-educated persons under 30 can use one programming language fluently. The computer and software industries have spent much time and money developing the "man-machine interface" so that the ubiquitous terminals are usable by the greatest number of people. Nevertheless, some minds seem naturally at home with the new technology, whereas for others it is a struggle. Some persons seems to have a built-in hostility to this form of communication, which is becoming so vital in society.

A person who is well adapted to the technology can carry out an amazing number of different functions from his home terminals. An ever-increasing worlds of computers, data banks, sound, film, and picture libraries is there for him to explore. Many authorities, however, still believe that the technology is only in its infancy. Certainly a vast amount of work lies ahead in building up the data banks, writing computer teaching programs, improving computer-assisted medical diagnosis, and so on. Many data-bank uses that met with initial skepticism from the professional men they were designed for, are now gaining wide acceptance, but the work required to make them comprehensive is enormous.

Much television interviewing takes place remotely with the subject being in his office or home, and interviewer being in the studio many miles away, often in a different country.

"High-fidelity" television proves to be popular, and cables for it are laid down in large numbers. Some affluent homes have wall-sized screens. The vividness of the large color picture provides a more "hot" medium in

McLuhan's sense of the word than the earlier small TV screen.

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It is clear that there is a grave shortage of channel bandwidth (as at most other times in history!). Higher-capacity cables are laid into the house. Millimeter-wave systems are used for carrying digital TV down the streets. The capacity of the nationwide helical waveguide channels is increased, and many thousands of miles of the new laser channels are built. Domestic satellites using laser frequencies are launched on a pilot basis, with the intention of building a domestic network that employs a large number of such satellites.

Three-dimensional television is demonstrated, using large wall screens.

"Personalized" newspapers come into operation. Instead of being presented with an impersonal and often superficial selection of all the news, as today, a subscriber may register his news-requirement "profile". He then receives detailed news on topics that interest him. This information may be printed out on his home terminal or stored for him so that he can display it on his screen when he wishes. All types of categories can be registered-- for example, local news about a district other than where he lives, news about a particular industry, company, or stock, scientific news, movie reviews by particular reviewers, news about crime, sex, war, or business, and foreign news.

Powerful satellites now permit home pickup of worldwide television with rooftop antennas. Some television programs are dubbed in many languages. Because a television sound channel requires only about one thousandth of the bandwidth of the picture, this does not substantially increase the overall bandwidth requirements. A rooftop antenna can now pick up almost as many television programs as sound stations on the shortwave radio of the 1960s.

The use of computers as a hobby has by now become widespread, and a major section of industry has grown up to cater to the computer amateurs.

Although some have mini-computers, the majority gain access to the machines with large files, using the various telecommunication facilities.

Magazines for the amateur market have come on the scene, and many systems and data banks have been designed for their use. They can obtain newsletters at their terminals and can register a "profile" to determine what categories of information they receive. Computing spreads like a drug to a large number of people, and once hooked they cannot let the machines alone. Computer amateurs, much more so than the radio amateurs of an earlier era, are able to make significant and original contributions to the industry, especially in programs and in data bank contents.

Telephones in vehicles are widespread. Cars are manufactured with the option of a Touchtone keyboard on the dial, alongside all the other electronic equipment. Discussion exists on whether a car telephone, plus a loudspeaker that is never switched off while the vehicle is on the public roads, should be a legal requirement. The loudspeaker would receive tones and voices that interrupt the car radio of music player and that are concerned with safety, accidents, parking, toll paying, route-finding, and so on. Improvements in the nationwide dialing system for vehicles are needed. In many parts of the country, a car still cannot be reached by a long-distance telephone call.

Personal portable telephones have been in use for some time by the military forces, who have achieved almost worldwide dialing of key persons. In the cities, fire, police, and other personnel have portable radiotelephones. Many corporations use portable telephones within factories or office buildings, and some are now setting up a nationwide corporate dialing network. A public service that is an extension of the car telephone service and that permits small transceivers to be carried anywhere is now clearly practicable. A nationwide paging system has been in use for some time, but there is no facility for the paged person to respond directly. He has to go to a telephone. There is pressure to make paging illegal in some areas in order that an individual there can feel free from the relentless pursuit of the new communication facilities.

Early 1990's

"Direct-access" data banks now exceed 10^{18} bits where usable. "Read-only" bulk storage is much lower in cost than storage that can be updated.

Mass production and mass marketing have given most homes wall screens. Laser channels are being laid into homes to give a very large number of high-fidelity TV channels. Dial-up channels (as opposed to cable TV channels) are being installed in limited numbers to carry the large-screen pictures. The latter are being sold mainly to industry and, to a lesser extent, to affluent homes. The situation regarding large-screen, dial-up facilities is about the same as that with Picturephone's in the mid-1970s. The office of a top-ranking executive is now likely to have a wall-sized screen facing his desk. It can either be connected in its entirety to another location or fragmented into several smaller screens for conferences or multimedia use. All such facilities are digital. Office and apartment blocks have small computers that act as concentrators and control screen fragmenting and switching.

The wall screens are now frequently used by lecturers. A lecturer may conduct a class of 16 or 32 people, all in different locations and all using Picturephone sets. They may be in their homes; they may be in worldwide business locations. The lecturer can see all of their faces, and they can see either his face or diagrams, objects, slides, or film clippings, which he switches on to their screens. He can speak to any of the "class" individually and they can speak to him. They cannot see their fellow students and so tend to ask questions with little embarrassment from possible class reaction. The teacher may occasionally let his students see the rest of the class. If he wants, he may switch the face of a questioner onto the class screens. On the other hand, he can address any one student without the others hearing. Similar facilities are used for sales meetings, management briefings, and by a manager addressing his employees who work at home. Some such links in industry are international.

Printed newspapers stop production in the United States except for a minor intellectual press, a few picture newspapers for low-IQ readers, and some local newspapers.

Television news has become exceeding vivid. At least one cable TV channel carries big-screen news all day. Very high quality photography on the wall screen shows riots and world catastrophes in fine detail, including local wars (limited nuclear or biochemical) and a new wave of famines in certain underdeveloped and overpopulated countries.

On the other hand, the unrest in the underdeveloped world is undoubtedly inflamed by their television window to the affluent nations.

A directory the size of the "yellow pages" is published, listing all the telecommunication services available and giving the codes necessary for communicating with the innumerable computers. Most shopping is done from the home screens. With increasing automation, employment in the service industries has become much greater than in the manufacturing industries, and now many persons are employed in giving specialized assistance in the information networks. The HELP key on the Touchtone telephone overlays (Fig. 11.10) and other devices are used frequently. As in the information centers of industry a decade earlier, it is found that much more useful facilities can be provided if specialized human assistance and human expertise are built into the system. Almost 10% of the United States Gross National Product is spent on the communication services discussed in this chapter (including broadcasting).

Late 1990's

Most people now carry a portable radio transceiver with a Touchtone keyboard. They have a wallet full of credit-card size overlays. When an individual is dialed, he can be reached in most parts of the country. The zones of radio inaccessibility are diminishing. It has been suggested that the public should be issued with transceivers that transmit their

national identification number, even when switched off. These devices would help in controlling crime, which is still growing at an appalling rate. They would also be used in most financial transactions.

Picturephone is now being rapidly replaced with a dial-up service that uses the digital wall screens. The wall screen can be linked either to the TV cable or to the new dial-up video-phone network. With the latter, one apartment or one room in a house can be connected to another via the wall screens. Large-screen videotape recorders are inexpensive, and families often dial up relatives to play them videotapes of the children.

The dial-up channel makes it possible to request movies for individual playing in the home.

"Personalized" video news services are set up. In the same way that printed news became individually selected for each subscriber "profile," now video big-screen newcasts are similarly assembled.

In addition to being able to select what he wants instead of passively watching what is fed to the masses, the home viewer now has a channel on which he can "converse" with the medium. This channel is often used for teaching. "Computer-assisted instruction" thus progressed from terminals giving an alphanumeric response from the computer, to terminals giving a color slide response and presentation, and then to terminals giving short movie sequences. All these facilities in turn were initially used in institutions and later were a dial-up or cable TV service to the home. The interactive media are used for many functions other than teaching, but much "passive" programming is still used also.

In large cities, the movie libraries are located close to the telephone (video-phone) central offices; and as the channel is permanently connected from the central office to the home, the telecommunication cost of dialing for movies or news is not high. In rural districts, however, it is very high because of the long-distance transmission to the movie

library. Here the distribution of movies in cartridges is likely to continue. In spite of the vast growth of telecommunications, there are thus still advantages in metropolitan living. The high bandwidth telecommunication services are much cheaper in the cities. We have not yet reached the point when the drop in long-distance transmission costs can overtake man's ability to consume increasing bandwidth.

Public movie theaters have declined under the competition from the home entertainment media and now cater to two main markets. First, they show movies with a degree of sex and obscenity not permitted on the home media and catering to a low-IQ market too poor to afford the wall screens. Second, other theaters show spectacular movies on screens occupying 180° to 360° of the field of vision; these screens can create an impact greater than the home wall screens.

Circular-domed rooms come into use in which the entire ceiling and walls are a three-dimensional color TV screen. These can be linked by a communication line to any appropriate camera system, videotape, or transmitter, or they can be operated from their own cartridge, which can generate an environment of sylvan tranquility, spring in the Andes, earth orbit, or the Kiluaea volcano erupting.

The ability to program and communicate with computers is now widespread. Among persons under 30, the inability to program is regarded as a form of illiteracy. There is a serious gap between the capabilities of young and old people in communicating with the all-pervading machines.

There is experimental use of drugs administered under electronic control in conjunction with entertainment media, largely to heighten and "edit" emotional reaction.

It seems clear to many authorities that the staggering advances in molecular biology are going to merge with the electronic technology. This prospect is dismaying to many older people (those who read this book in the 1970's), but strangely enough, a new generation of students is emerging that appears to welcome it!

APPENDIX III: WORKING NOTES ON DEFINITIONS OF HUMAN SETTLEMENTS

What follows is an attempt to reproduce some working sheets assembled to try to stimulate thinking about the impact of events on human settlements, the impact of communications technologies in particular. They should be regarded as working sheets and nothing more.

#1: ELEMENTS OF CITY WHERE ULTIMATE IMPACT OF EVENT MAY FALL

Population distribution	Energy availability
Size of conurbation	Average income/Ave. national income
Existence of concentration	Health, physical
Circulation patterns	Health, mental
Individual buildings or complexes	Means of export and import
Above or below ground	Financial system
Pollution	Cultural facilities
Crime	Distinctive characteristics
Violence	Surprises-- cities disappear
Economic base	-- totally new life style
Government organization	Architecture; building technology
Relation to other governments	Atmosphere-- feel of city
Growth rates	Integrated industries?
Standard of living	Legislative process
Segregation Black/White/other	Welfare
Education	Drugs
New "minority" groups	Societal groups: ideology, income,
Power structure	nationality, location, race,
Relation to individual	religion, sex, age
Ability to change	Planning methods
Economic system	Utilities
Demographic patterns	Privacy
Housing	Happiness
Citizen involvement	Degree of chance/risk/unexpected
Family relationships	Productivity
Class system/socio-economics	Total production
Emergency systems	Degrees of satisfaction at living there by various groups

Open or closed environment	Government bureaucracy
Options for future choice	Art
Health care delivery system	Place for entrepreneur
Degree of pluralism	Climate
Cultural pluralism	Resource allocation mechanisms
Topography	Trade patterns
Place for innovation?	Uniqueness
Information/communication	
Hours of activity	
Time constants for various types of actions	
Degree of self-consciousness	

Worksheet #2 was never completed but is still suggestive. It is a morphological analysis intended to suggest new types of communications services.

ACCESS TO SERVICE

<u>From/To</u>	<u>In/To</u>	<u>By</u>	<u>For</u>
Personal unit	urban core	old	Government service
Mobile unit	suburb	sick	
Home unit	rural	young	
Office unit	ocean	healthy	
Industry unit	other country	crippled	
Specialized terminal	city	unhappy	<div> <div> Global Federal State City Local </div> <div> Welfare Library Emergency Army Council Food Health Etc. </div> </div>
	other country not city	male/female	
	air	baby	
	ocean floor	poor/not poor	Business
	space	minority	Non-profit
	urban fringe	crazy	Family
	commune	spy	Club
	town		Affinity group
	farm		Utility
	acropolis		Office
	integrated building		Vehicle
	retirement village		Control area-- industry service
	mobile home		On foot
	squatter settlement		Bed place
			Eat place
			Recreation

Worksheet #2 (cont'd)

From/To

In/To

By

For

hermitage

Buy place

remote outposts

Think place

withdrawn community

Learning place

Exercise place

APPENDIX IV: FIRST PAPER WRITTEN BY THIS AUTHOR ON THE SUBJECT OF
POSSIBLE IMPACTS OF NEW COMMUNICATIONS TECHNOLOGIES
ON CITIES.

This paper is included to give another benchmark for evaluations of the use of IRAS since it was written before IRAS had been devised although after some of the working concepts had emerged.

Impacts listed in this paper but not included in Chapter IV of the thesis were either judged not sufficiently relevant to human settlements as defined in Appendix III or were not included because of time constraints. Chapter IV was largely based on a beginning to end scan of the impacts noted in this paper. Time ran out with impact XIX so much of the ground in this paper was not covered in Chapter IV.

INEXPENSIVE, MULTI-DIMENSIONAL COMMUNICATIONS AND CITIES

It is my purpose here to suggest some possible cause and effect chains that might emanate from a trend toward increasingly less expensive and more diverse forms of communications. The impact area of greatest interest is specified to be the city and urban life.

An outline format has been used to indicate nth order impacts. First order impacts are preceded by roman numerals, second order by capital letters, and so on.

It is with some trepidation that I set down the following lists. The analysis of historical causes and effects is always in dispute and there is no reason to assume that even the most obvious causal links, prima facie, will actually occur. In addition, the lists must mirror a sort of all inclusive set of futures; for this reason, some of the impacts will appear mutually inconsistent or even contradictory. This is merely to indicate the possibility of countervailing forces.

The ultimate purpose of such chains can only be to suggest targets for more intensive research.

A final caveat: no particular ordering has been introduced to these proceedings. Do not look for important things to fall first or for related impacts to lie close together on the page.

FIRST CAUSE: communications tends to become less expensive per bit transmitted, stored, or manipulated in real terms and as a fraction of per capita income. Types of communication increase. Technologies introduced include CATV; cassette TV; picture phones; holographic movies, TV, and real time transmission to supersede the picture phone; "dreamies" (personal fantasies and art forms created either by hologram, by direct introduction of images to brain, or some combination); wrist communicators; advanced electronic surveillance.

- I. Technologies probably developed first in US and possible Japan
 - A. If production prices cheap enough for world market may improve trade position
 - B. Cultural export device at first when most of programs recorded in US. When diffusion has advanced, increasing dependence on communications could be powerful homogenizing device.
- II. Helps communications companies
 - A. Rise in influence economically
 - B. Political influence possible
 - C. Helps shareholders, workers in that industry
 - D. Aids cities where industry grows particularly (New York, Los Angeles)
- III. More and more communications facilities built into new structures and less stress on internal movement within building possible, particularly with advent of cheap, life-size real-time holograms (it should be noted that present this is low probability because of at least short-term rise in energy prices; for short distances it seems more likely that walking will remain much cheaper, even if device used for distance communication-- companies forced to try to control use of device for internal calls?)
 - A. If less walking around and time spent for gathering large meetings, working efficiency may rise
 - B. Contact more frequent and spontaneous
 - C. May stimulate taller buildings if few elevators needed; seems highly unlikely
- IV. Remote buying becomes more prevalent either through live viewing or through cassette service
 - A. Greater emphasis on advertising
 - 1. Application for holograms
 - B. Further development of credit system, changes in banking
- V. Education may become more home-based
 - A. School without walls more prevalent; end to quandary of busing
 - B. Education more homogeneous
 - C. Education more available (potentially) if price is right; otherwise may actually be regressive step
 - D. Greater emphasis on factual learning, less on personal influence, at least until institutional changes made
 - 1. National educational, associative institutions permitting

students from all over country to have seminar "together"

2. Force development of sophisticated matching technologies
- E. Deemphasis of universities as physical centers
 1. University financial crises, many fatal
 2. Depersonalization of education may cause great frustration, unable to find physical focus
- F. Possibility of less discipline but more likely that education becomes more job-oriented without campus to make studying classics seem normal

VI. Difficult to predict impact on travel

- A. Only rich travel for use as status, plebs stay home and use realistic, cheap communications
- B. Travel becomes more prevalent on all levels as all see most graphically what possibilities are and use transportation to get there cheaply
- C. Travel declines as crowding of all tourist spots becomes acute; people rather stay home and realistically see wonders of world than battle effluvia of tourists

VII. Increasing use for delivery of medical care

- A. Resources applied increasingly to large med centers, with good transmission facilities, less to physical dispersion of care.
- B. General practitioner falls into further disrepute, replaced by higher paid, quite similar general diagnostician and paramedical (dispersed) much lower paid
- C. Human lifespan and productivity further increased, increasing average age

VIII. Cheap communications may enable pollution and congestion choked cities to come down harder on intracity use of automobiles

- A. Schemes to drive to distribution points just outside city and be taken to office by transit since won't need to move as much once downtown
- B. More people tend to transact business from home and not come downtown at all
- C. City movement system becomes more exclusively for use of pedestrians, goods movers, transit and taxis
- D. Pollution down
 1. Health levels up
- E. Format of city movement system gradually changes in response to new demands
- F. Cities begin to get smaller since fewer people want to come to town or live there-- greater diffusion of residences particularly

at higher income levels

G. Fewer parking garages needed in city core

IX. Three dimensional stills and movies in wider use

A. Applications to mapping and surveying

B. Contribution to planning education

1. Better planners?

X. Many applications toward care of elderly

A. Elderly able to make greater contributions, interact more fully even if not physically mobile

B. Elderly able to compete more effectively for jobs even if general job market declining

C. Impact on "elderly" system of care

1. More "homes" to take care of special needs provide developed communications facilities

2. Fewer "homes" because more old people able to care for selves longer

3. Increased incentive to live to be older

a. Average age increases

b. Impact on family structure

XI. Greater use of data banks coupled with personal communications

A. Less privacy

1. Expenditures for privacy up

2. System sabotage both to get at someone and to keep from being got.

B. Government able to centralize further

XII. Electronic town meetings

A. Greater democracy, more can participate, greater satisfaction

B. Greater democracy, greater frustration

C. Less democracy, more demagoguery, misleading instant voting

D. Data banks continue to outrun indexing producing piles of unusable information

XIII. Cities more devoted to being goods centers

A. Quality of life continues to decline as more people can move further away and still interact, get culture, etc.

1. Increasing crime rates
 - a. Disruption of production, distribution
 - b. Crackdown and increased violence in core
 - c. Increased unreality to people outside cities increasing alienation
 - d. Production moved outside cities also, some entire cores abandoned, core dwellers follow work and trouble continues
- XIV. Psychological effects of increasing communications
 - A. Need for increased privacy and personal isolation
 - B. Need for greater human, touching contact
- XV. Greater demands for electric power
 - A. Increased pollution from power plants
 - B. Increased power prices
 - C. Substitution of less power intensive devices
 - D. Increased research into high power low pollution devices fission power (particularly off coast on barges or islands), fusion power, solar power
- XVI. Possibility of less demand on petroleum reserves
- XVII. Even as available "culture" increases, so will "vast wasteland"
- XVIII. More channels available
 - A. Greater "pluralism"
 1. Economic redistribution
 2. Political channels
 3. Force toward cultural heterogeneity, not by geography but by individual and by taste
 4. Socialization disrupted as fewer common experiences
 - B. Pluralism not greatly increased due either to cost of initial acquisition of production facilities or (more likely) people continue to each produce for the greatest number of people's perceived desires and continue to copy from each other everything that seems to make more money.
- XIX. Advent of dreamies lowers use of some drugs as dreamies more versatile and can be planned or random
 - A. Might cause psychological "problems"; people like dreaming

better than living

- B. Impacts on crime rate, amount of exercise people get, etc.
- XX. Impact on urban government not clear-- computer information systems feasible for a while now and still not really used anywhere
- XXI. Home based education supports shortened work week and automation in transition toward more leisure based economy (with low growth rate?)
 - A. Reaction against "false pleasure" and reassertion of Puritan ethic-- seems unlikely to succeed but possible
 - B. Society increasingly static, less progress-oriented, value change: "get up and go" out
 - 1. Rate of movement toward equal income and full equity slowed; powered at present mostly by economic growth
 - 2. Rate of movement toward equity continues because growth continues albeit with increasing recycling and more expensive longer-lived products
 - C. Increased time for contemplation leads to more "altruism" CCC type work "for world"
- XXII. Agriculture becomes more popular as occupation as "culture" comes to the farm
- XXIII. Greater international contact
 - A. Increasing frustration, production motivation in developing countries-- pro-nationalism
 - B. Force for international homogeneity, single language nationalistic
 - C. Potentially powerful government tool for control
 - 1. Pro-nationalistic force
 - D. With shorter work week, more work at home, more international business contact, 24 hour life cycle begin to erode (possible) and light dark cycle (quite likely)
 - 1. Night life and day life begin to look alike
- XXIV. New duplication and storage industries for producing and utilizing new technology
- XXV. Rise in sophistication of computer control systems may make planned economy appear more feasible
 - A. Basic economic change
 - B. Changed role for entrepreneur
 - 1. Impact on city as entrepreneurial center

- C. Another force for static rigid society
 - 1. Increase in influence of conservative groups
 - 2. Conflict with "new" lifestyles coming in from other countries
- XXVI. Change in religions
 - A. A decline in traditional religion seems likely
- XXVII. Women much more able to assume working roles and men more likely to help care for home if each can work from there at least part of the time
- XXVIII. Integrated industries, each using others unwanted by products in a partially open cycle, more common due to rise in electronic marketplace stimulated as indicated above.
 - A. Pollution down
 - B. Demand for new, hard-to-find resources down
- XXIX. More communications related firms form
 - A. Communications support and distribution firms form
 - 1. Change in economic base of city
 - B. Communications firms for creative and clustering reasons choose to locate away from cities
 - 1. New clusters form, perhaps of electronics-aerospace-college-type
- XXX. As rate of urban information flow increases, conduits needed for transport
 - A. Wave guides
 - B. Lasers in tubes or optical fiber clusters
 - C. These will take space and (at least the lasers) will want straight lines
- XXXI. Increasingly sophisticated recording equipment
 - A. Previously non-recorded events will be recorded or shown live (e.g. plays, horseracing, electronic art)
 - B. Due to increasing recording, in many "static" academic fields and in dynamic ones also, demand for lecturers will decline as just a few recorded lecturers will suffice for a lot of people and a long time.
 - 1. Professors will either have to do more one-on-one; research to support costs of the communications equipment, or seek other employment

- a. Blow to people in esoteric fields many of whom can make a living lecturing the same subject in different places at different times
- b. Academic resistance for this reason and because of IV, E.
- c. Lowering of social benefit and satisfaction

XXXII. A whole set of effects will result from the technologies (of the new communications) being applied in different ways or leading to innovation in other areas

XXXIII. Communications regulations will have to be revamped considerably or break down totally

- A. Because of a possible increasing emotional cogency of communications, there may be attempts to introduce censorship on an urban, state, national or global level

XXXIV. Because of the cogency of communications, new forms of "pornography" of a really dangerous sort may become widespread (e.g. self-hypnosis patterns, cassettes that really bring deviant behavior to life, dreamies that slowly induce psychoses)(see XXXIII, A)

- A. Aberrant behavior could distort the urban lifestyle, mental health, and security
 - 1. This could be a particularly potent disruptive force when seen coupled with the drop in socialization possible caused by pluralistic communications, wider flow of ideas, perceptions of inequity, and "school at home"
- B. Pornography probably means some sort of illegal organization in control
- C. Because of the pervasiveness of affluence and the new communications, the drop in the quality of life will probably not be restricted to the urban core
- D. "Pornography" will probably be used as another excuse to extend the rights of governments in crime control through advanced surveillance

XXXV. Communications transmission and reception will be a part of all human settlements, not just cities

- A. If some facilities attractive but expensive (real time holography) clustering might be induced along with social patterns of joining usage
- B. Wither personal long distance communications at moderate price, group activity could become more important part of daily life; calling others constantly
- C. In reaction, meditation and privacy would possibly become more jealously guarded and more infrequent
 - 1. Conventions as to "calling etiquette" would arise

XXXVI. Recording technology cheaper

- A. Typewritten letters might enter a decline, to be replaced by small cassette tapes, perhaps with video. This has already begun with audio cassettes.

APPENDIX V -- GLOSSARY

Definitions in this glossary are made for the purposes of this thesis and should not be taken as necessarily generally correct.

Alternate futures: an image of the future as a set of distinct possibilities. Each possible future usually is spoken of as having a probability of occurrence as seen from the present. See p.17.

Assessment: an attempt to intelligently guess what events might occur due to the occurrence of some primal event. That first event might be expected to occur in the future, might have occurred in the past, might be only hypothetical. See p.17.

Cassette television: a combination of the present cassette concept in tape recorders plus television, all for very little money. Presently in the advanced development state.

CATV or Cable television: Community Antenna Television -- a way of receiving twenty or sixty channels plus getting a capability to send your own simple signals back to a central station in all cable systems henceforth. Expected to saturate most of the country in a decade or so. It will make local origination of programming to small audiences economically feasible. See bibliography for references to a few more technical and detailed explanations.

Delphi: an iterative questionnaire technique commonly used in future studies for getting a diverse panel of experts to agree while eliminating some of the undesirable effects of committee meetings. All replies are anonymous and condensed on subsequent questionnaires so that a panel member can change his reply based on weight of opinion or arguments but not on the basis of tone of voice, who speaks first, etc.

FAR or Field Anomaly Relaxation: a type of morphological analysis and synthesis technique for constructing all plausible scenarios of global development. Explained in detail and footnoted on pp.24-26.

Future studies: any effort which makes an attempt to deal with the future by trying to figure out what it might look like or might not look like or which tries to improve methods for doing same might be found hiding under this label

Human settlements: cities, villages, communes- hamlets, etc. See Appendix IV.

Impact: an effect of an event

Innovation: a new way of doing things

IRAS: Impact Ranging by Alternate Scenarios. An assessment method developed by the author and first tested in this thesis.

Picturephone: a telephone with a moderate definition television picture. In use in some test cities.

Scenario: a sketch of some aspects of a given alternate future over a period of time.

Scene: a sketch of some aspects of a given alternate future at a point in time

Social Indicator: a statistic or other objective experimental result used to make judgments on the extent, magnitude, direction of a particular change in society. Gross National Product is an economic indicator. The crime rate is a social indicator.

Technology Assessment: assessment of the impacts of a technology

Technology Forecasting: Prediction of an invention or other aspects of technology transfer (for a given place and time, usually).

Technology forecasts frequently take a given problem area and attempt to predict what inventions will be made in the area and about when they will be made and when they will be used to do certain things.

Working into the future: the idea that the main relevance of future studies to society is as a constant corrective to societal directions, that society should not pick goals (end points) but directions and then attempt to intelligently muddle through, eyes open and feelers extended.

THE STAR-SPLITTER

"You know Orion always comes up sideways.
Throwing a leg up over our fence of mountains,
And rising on his hands, he looks in on me
Busy outdoors by lantern-light with something
I should have done by daylight, and indeed,
After the ground is frozen, I should have done
Before it froze, and a gust flings a handful
Of waste leaves at my smoky lantern chimney
To make fun of my way of doing things,
Or else fun of Orion's having caught me.
Has a man, I should like to ask, no rights
These forces are obliged to pay respect to?"
So Brad McLaughlin mingled reckless talk
Of heavenly stars with hugger-mugger farming,
Till having failed at hugger-mugger farming
He burned his house down for the fire insurance
And spent the proceeds on a telescope
To satisfy a lifelong curiosity
About our place among the infinities.

"What do you want with one of those blame things?"
I asked him well beforehand. "Don't you get one!"

"Don't call it blamed; there isn't anything
More blameless in the sense of being less
A weapon in our human fight," he said.
"I'll have one if I sell my farm to buy it."
There where he moved the rocks to plow the ground
And plowed between the rocks he couldn't move,
Few farms changed hands; so rather than spend years
Trying to sell his farm and then not selling,
He burned his house down for the fire insurance

And bought the telescope with what it came to.
He had been heard to say by several:
"The best thing that we're put here for's to see;
The strongest thing that's given us to see with's
A telescope. Someone in every town
Seems to me owes it to the town to keep one.
In Littleton it may as well be me."
After such loose talk it was no surprise
When he did what he did and burned his house down.

Mean laughter went about the town that day
To let him know we weren't the least imposed on,
And he could wait-- we'd see to him tomorrow.
But the first thing next morning we reflected
If one by one we counted people out
For the least sin, it wouldn't take us long
To get so we had no one left to live with.
For to be social is to be forgiving.
Our thief, the one who does our stealing from us,
We don't cut off from coming to church suppers,
But what we miss we go to him and ask for.
He promptly gives it back, that is if still
Uneaten, unworn out, or undisposed of.
It wouldn't do to be too hard on Brad
About his telescope. Beyond the age
Of being given one for Christmas gift,
He had to take the best way he knew how
To find himself one. Well, all we said was
He took a strange thing to be roguish over.
Some sympathy was wasted on the house,
A good old-timer dating back along;
But a house isn't sentient; the house
Didn't feel anything. And if it did,
Why not regard it as a sacrifice,

And an old-fashioned sacrifice by fire,
Instead of a new-fashioned one at auction?

Out of a house and so out of a farm
At one stroke (of a match), Brad had to turn
To earn a living on the Concord railroad,
As under-ticket-agent at a station
Where his job, when he wasn't selling tickets,
Was setting out, up track and down, not plants
As on a farm, but planets, evening stars
That varied in their hue from red to green.

He got a good glass for six hundred dollars.
His new job gave him leisure for stargazing.
Often he bid me come and have a look
Up the brass barrel, velvet black inside,
At a star quaking in the other end.
I recollect a night of broken clouds
And underfoot snow melted down to ice,
And melting further in the wind to mud.
Bradford and I had out the telescope.
We spread our two legs as we spread its three,
Pointed our thoughts the way we pointed it,
And standing at our leisure till the day broke,
Said some of the best things we ever said.
That telescope was christened the Star-Splitter,
Because it didn't do a thing but split
A star in two or three, the way you split
A globule of quicksilver in your hand
With one stroke of your finger in the middle-
It's a star-splitter if there ever was one,
And ought to do some good if splitting stars
'Sa thing to be compared with splitting wood.

We've looked and looked, but after all where are we?
Do we know any better where we are,
And how it stands between the night tonight
And a man with a smoky lantern chimney?
How different from the way it ever stood?

Robert Frost